The Orchadian

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Official Journal of the Australasian Native Orchid Society Inc.

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Newly described species *Corybas autumnalis* Photo Andrew Brown

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Shows and Events

ANOS Melbourne Suburbs Inc. Spring Show
Saturday 5th October 2019. Montrose Town Centre, 935 Mount Dandenong Tourist Rd, Montrose. 10 am to 4 pm (plant sales from 9.30 a

ANOS Illawarra Late Spring Show
12-13th October. 2019 Old Courthouse, Cliff Road, Wollongong 2500. Saturday 9 am to 4 pm, Sunday 9 am to 3

ANOS Central Coast Late Spring Show
12-13th October 2019. Narara Valley Nursery, 2 Manns Road, Narara 2250. 9 am to

ANOS Newcastle *Sarcochilus* Show
19-20th October 2019, Windale Bowling Club, 2A Lake Street, Windale 2306. Saturday & Sunday 10 am - 4 pm.

ANOS Sydney Group Sarcanthinae Native Orchid Show
19-20th October 2019. Kellyville Village Shopping Centre, 90 Wrights Road, Kellyville.

ANOS Macarthur October Show
26th October 2019. Intersection Oran Park Drive & Peter Brock Drive, Oran Park. 9 am - 4 pm.

ANOS Geelong Show
Sat. 9th November 2019. Christ Church Geelong, 57 McKillop St., Geelong. 9 am to 4 pm.

ANOS Sydney Native Cymbidium Celebration
14th November. Baulkham Hills Community Ctre, 15 Conie Ave, Baulkham Hills. 8 pm to 10 pm.

Corybas is a widespread genus from India and Thailand in the north and extending a long distance south to Macquarie Island and islands south of New Zealand. The distribution is not easily explained in terms of continental plates and evolutionary theories. Andrew Brown and David Edmonds describe a new and distinctive species, *Corybas autumnalis*, apparently limited to the Walpole area of Western Australia. It flowers early, in April and June and has a much smaller leaf than a near relative *C. recurvus*, and creamy- white to pink flowers with a prominent creamy-white area on the labellum.

Kevin Thiele summarized best taxonomic practice in *Australasian Systematic Botany Newsletter* 158 (March 2014), and the *Corybas* paper meets all of the appropriate requirements. Kevin stated that publications of new species should be in peer reviewed journals with an adequate description, clear statements of range and patterns of variation, differences identified between the taxon and others to allow it to be uniquely diagnosable, and keys and notes to be provided where appropriate. There should be an attempt 'to justify taxonomic merit rather than mere assertions that they are different'. The result of low merit in publishing new species can be non-acceptance, or reduction to synonymy with another.

The *Corybas* discovery was made while looking for fungi at a time when many orchids are not in flower. One way to increase the chances of finding new species is to visit habitats not well examined previously, and at times outside the usual ones when orchids flower. We are looking for more contributions on conservation in various regions. Conservation studies require a large commitment in time and focus and considerable detail in writing up results. The reader needs to delve into the detail to appreciate what is happening in the habitat, and how conclusions are made. Mark Wapstra and Anne Chuter provide some reassurances that some species, in this case *Pterostylis atriola* (snug greenhood) in Tasmania, can survive commercial forestry disturbance and avoid listing as an endangered species.

Dendrobium section *Rhizobium* is increasing in popularity and some of the next steps in breeding are outlined by Callyn Farrell. The plants grow relatively rapidly so it should not be long before preliminary results are known and another generation is planned.

The Ninth ANOS Inc. Conference and Show was held on 21–26th August at Strathpine, Queensland in conjunction with ANOS (Qld) Kabi Group Inc. A considerable effort over more than a year was required in planning and conducting the event, led by ANOS Council Inc. in association with key members of the Kabi group. It was a great success with a keen group of registrants who enjoyed the two and half days of presentations, and the lively interactive discussions which followed. The major presentations will be published in detail in the following editions of the journal, allowing access for those who could not attend and for our overseas membership. There was a well supported photographic competition with more than 50 exhibits, as well as a non-competitive display. The Botanical Artists Society of Queensland staged a fine exhibition of botanical art. Kempsey Speciosum Spectacular was held a week after the conference and again attracted a large number of visitors.

There will be further articles on the 9th ANOS Conference and Show, and the Kempsey Spectacular in future issues.

Correction: For the *Cymbidium suave* article (*The Orchadian* June 2019), Bob Sullivan informs that he waters the plant about every 8 days in winter, and more frequently in summer.

Comment: In the last issue 'The Search for Australian Coelogyne' prompted a comment from Wayne Harris that *Coelogyne miniata* is not found in New Guinea. Andre Schuiteman confirms that it occurs only in Sumatra. Java and Bali, and the old record for New Guinea based on the synonym *C. lauterbachiana*, is due to a mislabeled specimen.

Peter Adams

The new ANOS Council for 2019–20 was elected at the well-attended Annual General Meeting at Strathpine Community Centre on 23 August, 2019. The new council members are Vice President Warren Wilcox, who is president of ANOS (Qld) - Kabi Group, National Registrar of Judges Mike Fish, (from Central Coast, New South Wales) and Conservation Officer Geoff Curry, President of Threatened Plants Tasmania. Peter Adams was elected President, Roslyn Capell, former Conservation Officer, was elected as Secretary and David Brewster as Treasurer. Sheryl Lawson is Past President, David James continues as Membership Secretary and councillors Barry Dudman, Callyn Farrell and Malcolm McGowan continue their service. Many thanks to all members of the last council and especially to retiring members Rick Winch (Secretary) and Tony Clarke (Past President) who have worked hard for ANOS over many years. Special thanks are also due to Dave Groffen, retiring National Registrar of Judges and a past treasurer.

The 9th ANOS Conference and Show was a successful event in all respects, and special thanks are due to the planning committee and the Kabi Group for the staging and operation over 23–26th August. More details are provided in the report in this issue. A formal review will consider the effort and results with a view to the nature and options for future ANOS main events.

Is Conservation a Possibility in the Nambucca Valley?

Returning from the Conference and Show, and from the Kempsey Speciosum Spectacular, I spent a day on a road trip in the upper Nambucca valley, centred on Macksville, NSW. This is the land of Slim Dusty's *Pub with No Beer* at Taylors Arm, a good lunch spot. It was a prime region for warm temperate rainforest epiphytic orchid habitat 30 years ago. *Dendrobium speciosum* var. *hillii*, several terete-leaved dendrobiums, *D. tetragonum*, *D. gracilicaule*, *D. kingianum*, *Sarcochilus falcatus* and other *Aeridinae* genera were very common in relatively intact rainforest along rivers and creeks, and in adjacent sclerophyll forest. The majority of this valley habitat has been cleared and replaced by urban development and dairy and other farming activity, and remaining rainforest patches are often covered in the smothering South American vine *Cardiospermum grandiflorum* (balloon vine) and grazed by exotic animals which pollute the creeks, currently evident from overgrowth of green algae. Clearance of sclerophyll forest, which provided an essential buffer for humidity and protection against excessive exposure on the slopes adjacent to rainforest, has resulted in very few orchids surviving on remnant trees along the creeks.

Over a day amongst valleys of mainly *Lantana*, *Solanum mauritianum* (wild tobacco bush), and exotic grasses and vines, and only a few cows and horses, I saw some remnant flowering *D. gracilicaule*, a single mature *D. speciosum* var. *hillii* and a seedling, a single plant of *D. teretifolium* var. *teretifolium* on *Casuarina* and several small *Sarcochilus falcatus* plants. The standard approaches to conservation have not worked here. Only a total realistic reappraisal and effective action plan for multipurpose land use can prevent this region becoming the Valley with No Orchids.

Peter Adams

Cleared rainforest and tree-smothering balloon vine. Photo M. Daniels

Corybas autumnalis (Orchidaceae), a rare new species of helmet orchid from south-west Western Australia

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Abstract

A rare new species of *Corybas* from the Walpole area of Western Australia is described and illustrated and its relationships with related taxa discussed. Its conservation status is also discussed. The species was previously listed on Western Australia's plant name census as a phrase-named taxon.

Introduction

In early May 2018 one of us, David Edmonds, was in the field with Ros Burnside and Katie Syme, mapping peat as volunteers for the Walpole-Nornalup National Parks Association and looking for fungi. During these searches a flowering *Corybas* sp. was located and following a wider search more plants were found.

It was easily recognised as being distinct from the common *Corybas recurvus* D.L. Jones which also grows in that area by its different flower morphology and smaller leaf. It also occupied different habitat to that of *C. recurvus* and had a much earlier May flowering period (*C. recurvus* typically flowers in July–early September). There are three other named species of helmet orchid found in Western Australia, *C. abditus* D.L. Jones, *C. despectans* D.L. Jones & R.C. Nash and *C. limpidus* D.L. Jones. Only the morphologically dissimilar *C. abdidus* is found in similar habitat to that of the new species but it flowers in late October–November. The other two species occur in coastal consolidated sand dunes and flower in July–September.

A week after its discovery a small group comprising Anna de Haan (Western Australian Native Orchid Study and Conservation Group (WANOSCG) Southern Rivers Branch), Jackie Manning (Department of Biodiversity, Conservation and Attractions) and the authors of this paper met north of Walpole and proceeded to the location where the orchid had been found a week before. The area was a seasonally wet flat that had been burnt six months previously, the sort of habitat where you might find *Corybas abditus* much later in the year. It was quite unlike the habitat of other *Corybas* species found in Western Australia.

A year later, in May 2019, we again visited the site and with a group of volunteer searchers from WANOSCG found 33 flowering plants spread over about 50 m. Despite searching other parts of the large seasonally wet flat no other plants were found. The following day we surveyed six additional areas of similar habitat in the Walpole area without success.

To date, just one population of the new *Corybas* is known.

Methods

Examination of flowering plants in the field and dried specimens lodged at PERTH have been conducted, enabling morphological comparisons between the new taxon and other currently named Western Australian taxa. Photographs and descriptions of all known Australian *Corybas* species were viewed in publications on Australian orchids (Backhouse, 2019; Backhouse et. al., 2016; Jeanes & Backhouse, 2001; Jones, 1998, 2006) to ascertain its distinctiveness from other Australian taxa.

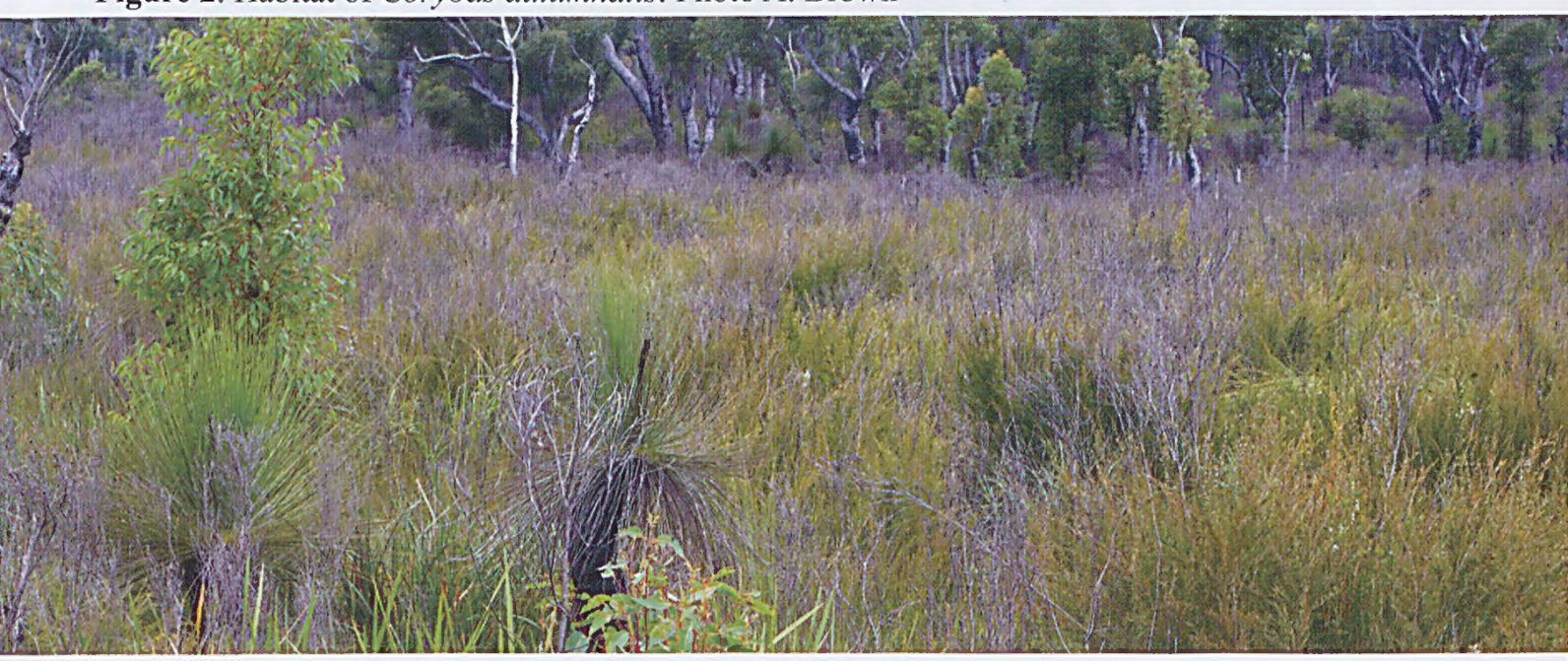
Figure 1. *Corybas autumnalis*. Photos A. Brown

1A flowering plants *in situ*.

1B flowering plant showing the small leaf and erect flower with a broad creamy-white to pinkish maroon dorsal sepal and pinkish-red labellum.

1C non flowering leaves.

Figure 2. Habitat of *Corybas autumnalis*. Photo A. Brown



Taxonomic description

Corybas autumnalis A.P. Br. & D. Edmonds, *sp. nov.*

Type: Walpole, Western Australia [precise locality withheld for conservation reasons], 10 May 2019, *A. Brown & D. Edmonds* APB 4314 (*holo*: PERTH 09083073).

Corybas sp. peat (A. Brown & D. Edmonds APB 4314), Western Australian Herbarium, in *FloraBase*, https://florabase.dbca.wa.gov.au/ [accessed 3July 2019].

Illustrations. A.P. Brown, New Helmet Orchid (*Corybas* sp.) found in the lower Southwest, *Bulletin of the Western Australian Native Orchid Study and Conservation Group*, June ed., p. 2 (2018)[as *Corybas* sp.] and *Orchids of South-west Australia – fourth edition*, P. 265 (2019) [as *Corybas* sp. 'peat'].

A small tuberous, *herb* 12–15 mm high when in flower. *Plants* solitary or in small to large groups. *Tuber* globose, 4–6 mm long, 3–4 mm wide, creamy-white, annually replaced with new tuber produced at the end of an elongate lateral side-shoot (root-like stolon). *Leaf* solitary, basal, held flat on the ground, immature at anthesis and often hidden by the flower; *Lamina* 5–8 mm long, 5–8 mm wide at anthesis increasing to 9–12 mm long, 9–12 mm wide when mature, glabrous, flexuose, broadly cordate to orbicular, flattened in TS, pale green above and below, margins entire, apex obtuse to rounded. *Flower* solitary,9–11 mm long, 8–10 mm wide, predominantly glabrous, creamy-white to pinkish-maroon, sessile; floral odour undetectable to humans. *Dorsal sepal*12–15 mm long, 6–8 mm wide, glabrous, creamy-white to pinkish maroon, often with darker pinkish maroon striations, shortly spathulate, curved forwards and hooding the labellum, apex mucronate. *Lateral sepals*1.5–2 mm long,±0.5 mm wide, glabrous, creamy-white, linear-tapered, acute to acuminate, connate at base, splayed outwards below the labellum lamina.*Petals*±1mm long,±0.5 mm wide, glabrous, creamy-white, auriculate at the base then tapering to a filiform point, entire and splayed outwards below the labellum lamina. *Labellum* conspicuous, scarcely motile, stiffly sprung on a short claw 1.5–2mm long, ±1 mm wide; *Labellum tube* shorter than the lamina, erect at base then abruptly decurved through 180 degrees and greatly expanded into a circular or oblate lamina; *lamina*, 9–11 mm long, 8–10 mm wide, pinkish-maroon with a creamy-white central bossand creamy-white stripe between the boss and the apex of the labellum, incurved with its margins projected forwards and bearing irregular short teeth, the central boss with a prominent raised circular ridge forming a shallow cup where it enters the labellum tube,margined with scattered pinkish-maroon eglandular hairs. *Auricles* at the base of the labellum tube,±1 mm long x ±0.8 mm across, widely opening and projecting downwards; *Column* hidden within the flower, 2–2.5mm long, erect, 2-winged; the wings when combined 1–1.5mm wide, broadly rectangular, incurved, somewhat opaque, creamy-white. *Anther* ±1 mm long, ±1 mm wide, creamy-white, obtuse, not terminating in a definite point. *Pollinia* ±1 mm long, four in two pairs, lamellate, granular, pale yellow. *Stigma* ovate, ±1 mm long, ±1 mm wide, dull creamy-yellow. Ovary obliquely ovoid, 1.5–2mm long, ±1 mm widepale green to creamy-green with pale brownish-maroon longitudinal stripes. *Capsule* not seen.(Figure 1)

Other specimens examined. WESTERN AUSTRALIA: Walpole, Western Australia [precise locality withheld for conservation reasons], 15 May 2018, *A. Brown & D. Edmonds* APB 4312.

Phenology. Flowering late April–early June. Fruiting unknown but thought likely to be July–August.

Distribution and habitat. Found over a small geographic range north of Walpole, growing in moist peaty soil in a seasonally wetflat. Associated species include *Banksia littoralis*, *Callistemon glauca*, *Empodisma gracillimum*, *Homalospermum firmum, Leptocarpus tenax, Mesomelaena graciliceps* and *Taxandria juniperina*.(Figure 2)

Conservation status. Currently listed as Priority Two under Conservation Codes for Western Australian Flora (Smith and Jones 2019), under the name *Corybas* sp. Peat (A. Brown & D. Edmonds APB 4314). The species is currently known from a single population comprising 33 mature plants. Although it occurs in a National Park the species is threatened by small population size, a lack of natural pollination in the two years

Figure 3. *Corybas recurvus* showing the prominently recurved flowers and large leaves. Photo A. Brown

the species has been monitored, feral pigs and altered fire regimes (prescribed burning).

Etymology. From the Latin *autumnalis* (of autumn) in reference to its autumn flowering period.

Affinities. *Corybas autumnalis* can be distinguished from all other Australian *Corybas* species by its small leaves which are immature at anthesis and often hidden by the flower, its distinctive creamy-white labellum boss with a prominent raised circular ridge forming a shallow cup where it enters the labellum tube and the prominent creamy-white stripe below the labellum boss, the latter feature shared with the otherwise dissimilar *C. carinatus* (J.J.Sm.) Schltr. which is endemic to Malaysia, Java, Borneo and Sumatra. In addition to these differences other distinguishing features are discussed for Australian species listed below.

In Western Australia *C. autumnalis* is perhaps closest in morphology to *C. recurvus* (Figure 3) but is readily distinguished by its smaller leaf, 5–8 mm long × 5–8 mm wide at anthesis (*c.f.* leaf 12–40 mm long × 12–40 mm wide in *C. recurvus* and fully formed at anthesis), its smaller, 9–11 mm long × 8–10 mm wide, erect, pale white to pinkish-red flower (*c.f.* flower 15–25 mm long × 14–24 mm wide, prominently recurved and deep reddish-purple to purplish-blackin *C. recurvus*), its well defined creamy-white labellum boss with a prominent raised circular ridge forming a shallow cup where it enters the labellum tube (*c.f.* labellum boss less well defined, reddish-purple and lacking aprominent raised circular ridge in *C. recurvus*) and the prominent creamy-white stripe below the labellum boss (*c.f.* the labellum of *C. recurvus* is entirely reddish-purple to purplish-black and lacks a creamy-white stripe below the boss). *Corybas autumnalis* also has has an earlier flowering period in late April–early June (*c.f.* late June–early September for *C. recurvus*) and occupies seasonally wet flats (*c.f.*forests, woodlands and near coastal shrublands for *C. recurvus*).

Corybas autumnalis may be distinguished from the more distantly related *C. limpidus* by its smaller leaf, 5–8 mm long × 5–8 mm wide at anthesis (*c.f.* leaf 18–35 mm long × 20–35 mm wide in *C. limpidus* and fully formed at anthesis), its smaller, 9–11 mm long × 8–10 mm wide, pale white to pinkish-red flower (*c.f.* flower 12–15 mm long × 8–11 mm wide and greenish-maroon with prominent maroon striations and blotches in *C. limpidus*), its labellum boss with a prominent raised circular ridge forming a shallow cup where it enters the labellum tube (*c.f.* labellum boss lacking aprominent raised circular ridge in *C. limpidus*) and the prominent creamy-white stripe below the labellum boss (*c.f. C. limpidus* lacks a creamy-white stripe below the labellum boss). *Corybas autumnalis* also has has an earlier flowering period in late April–early June (*c.f.* July–early September for *C. limpidus*) and

occupies inland seasonally wet flats (*c.f.* coastal consolidated coastal dunes for *C. recurvus*).

The only Western Australian *Corybas* species that is known to grow in the same habitat as *C. autumnalis* is the dissimilar *C. abditus* which has a tubular flower, deep purplish-red colouration and a much later flowering period in October–early November.

Several Eastern Australian *Corybas* species appear distantly related to *C. autumnalis* with perhaps *C. incurvus* D.L. Jones & M.A. Clem. being the most similar based on descriptions and images in books and DVDs on Australian orchids and in online image sites. *Corybas autumnalis* may be distinguished from *C. incurvus* by its smaller leaf, 5–8 mm long × 5–8 mm wide at anthesis (*c.f.* leaf 15–30 mm long × 15–25 mm wide in *C. incurvus*), its smaller flower 9–11 mm long, 8–10 mm wide (*c.f.* flower 12–17 mm long × 10–15 mm wide in *C. incurvus*), its labellum boss with a prominent raised circular ridge forming a shallow cup where it enters the labellum tube (*c.f.* labellum boss lacking a prominent raised circular ridge in *C. incurvus*) and the prominent creamy-white stripe below the central labellum boss (*c.f.* stripe absent in *C. incurvus*).

Corybas autumnalis may also be more distantly related to *C. undulatus* (R. Cunn.) Rupp but is distinguished from that species by its smaller leaf which is immature, 5–8 mm long × 5–8 mm wide at anthesis (*c.f.* leaf 10–20 mm long × 9–18 mm wide in *C. undulatus*), its smaller, 9–11 mm long, 8–10 mm wide, erect, pale white to pinkish-red flower (*c.f.* flower 10–13 mm long × 9–12 mm wide, prominently recurved, purplish-red and grey in *C. undulatus*), its labellum boss with a prominent raised circular ridge forming a shallow cup where it enters the labellum tube (*c.f.* labellum boss lacking aprominent raised circular ridge in *C. undulatus*) and the prominent creamy-white stripe below the central labellum boss (*c.f.* stripe absent in *C. undulatus*).

Acknowledgements

The authors would like to thank Ros Burnside and Katie Syme who were with one of us (David Edmonds) when the new species was discovered. We would also like to thank Jackie Manning, Anna de Haan and members of WANOSCG who assisted in surveys for the orchid.

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Andrew Brown is Research Associate at the Western Australian Herbarium specialising in the Orchidaceae and Scrophulariaceae. *He is author/co-author of seven books and 140 journal publications on Western Australian plant taxa including the formal description of over 140 new plant species for the State.*

David Edmonds is a Veterinarian, wildlife ecologist, orchid grower and volunteer with the Walpole Nornalup National Parks Association (WNNPA). He has a Masters in Conservation Medicine, specialising in the identification and management of threatening processes in populations within their natural environment.

Response of *Pterostylis atriola* (snug greenhood) to forestry disturbance in Tasmania

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Summary

Pterostylis atriola (snug greenhood) is endemic to Tasmania, with a widespread but usually highly localised distribution, occurring on a range of substrates, mainly in dry sclerophyll forest. As a forest-dependent species, commercial wood production poses a potential threat to a species formally listed as rare (threatened) on the Tasmanian *Threatened Species Protection Act 1995*. Long-term monitoring of the response of the species to different forms of native forest silviculture revealed that the species persists in areas subject to older forms of clearfell-burn-sow forestry and more modern silvicultural practices. It is concluded that commercial forestry is not a significant threat to the species, although its rare status remains valid pending further information on its response to seasonal and longer-term climate patterns.

Introduction

Tasmania is home to around 214 species of native orchids (Jones et al. 1999; Jones 2006), comprising c. 11% of the State's vascular flora (de Salas & Baker 2018). Approximately one third of the state's native orchid flora is listed as threatened under either the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Table 1), with 78 species listed on these Acts. There is a current recovery plan for threatened Tasmanian orchids adopted by the Tasmanian and Commonwealth governments (TSS 2017). Tasmania's orchids have been subject to a range of threats since European settlement, including habitat clearance, fragmentation and degradation of habitat, agricultural practices, inappropriate fire regimes, deleterious grazing and disturbance regimes, and the spread of diseases and pest species. For many orchids the impacts of these threats have been amplified by small population sizes and narrow distributions (TSS 2017).

General Information

The focus of this paper is *Pterostylis atriola* D.L. Jones, a distinctive endemic member of the genus that is easily separated from the other three Tasmanian species in the subgenus *Speculantha* (Jones & Clements 2002) on various morphological features (see Plates 1 & 2). The species was described in 1998 (Jones 1998) from material collected on Snug Tiers, hence the vernacular name of 'snug greenhood' (Wapstra et al. 2005+). The name is also reflective of its snug little flowers. In 2001, it was first listed as endangered on the Tasmanian *Threatened Species Protection Act 1995* (TSPA), at a time when its distribution was poorly understood and it was known from a small number of sites. The species was also hitherto listed as Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The species was downlisted to rare on the TSPA in 2011, recognising the increased number of subpopulations but that the total population still consisted of fewer than 10,000 mature individuals and no more than 2,500 of the mature individuals occurred on land in an area free from sudden processes capable of causing largely irreversible loss of individuals or habitat (TSS 2011). The downlisting from endangered to rare on State threatened species legislation resulted in the delisting of the species from Commonwealth threatened species legislation.

Pterostylis atriola occurs mainly in the eastern half of the State (Figure 1) and is known from about 16 subpopulations (TSS 2011). The subpopulations are widely separated, ranging from near-coastal lowland and hinterlands in the north and east to c. 600 m above sea level in the southeast at Snug Tiers. It is found on generally stony soils on a wide range of substrates including Jurassic dolerite, Devonian granodiorite and Permian mudstone, and on varying aspects/topographies (exposed ridges, upper slopes, frost hollows,

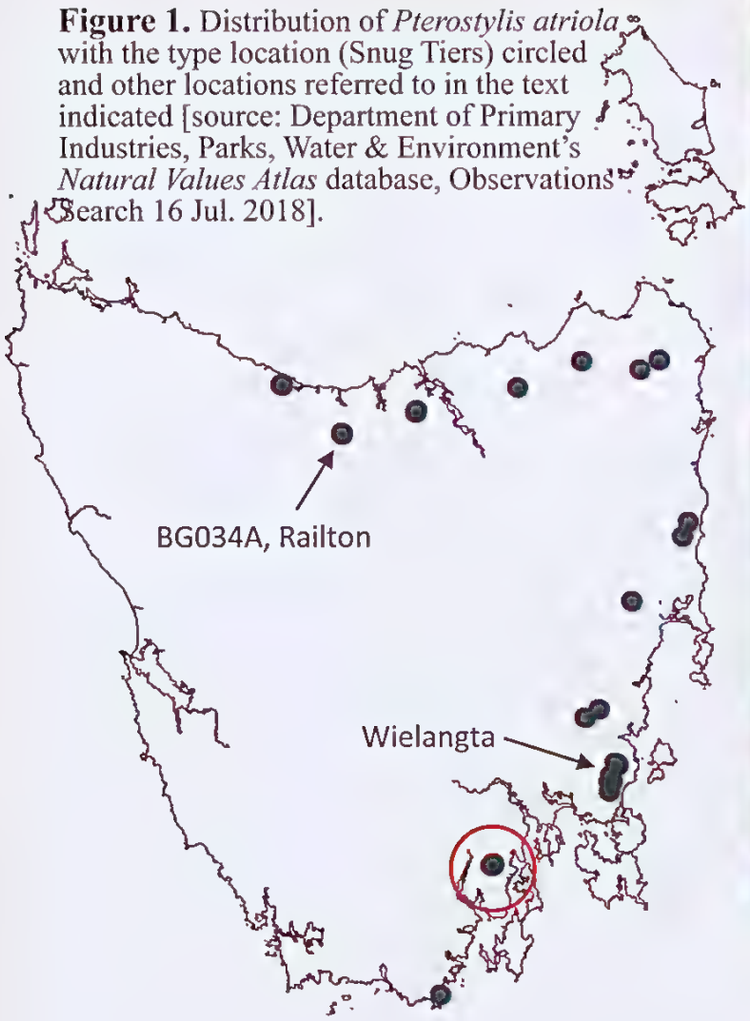

Figure 1. Distribution of *Pterostylis atriola* with the type location (Snug Tiers) circled and other locations referred to in the text indicated [source: Department of Primary Industries, Parks, Water & Environment's *Natural Values Atlas* database, Observations search 16 Jul. 2018].

LEFT: **Plate 1**. Inflorescence of *Pterostylis atriola* showing multiple inward-facing flowers and buds and the scabrous scape and galea (Wielangta, 16 Feb. 2012: M. Wapstra)

RIGHT: **Plate 2**. Close-up of single flower of *Pterostylis atriola* showing the distinctive brown tips to the segments and the scabrous galea (Wielangta, 9 Mar. 2015: M. Wapstra)

gorges, rock plates). It occurs in dry sclerophyll forest, typically with an open understorey, for example, shrubby *Eucalyptus obliqua* forest, shrubby/heathy *Eucalyptus amygdalina* forest (Jones 1998, Jones et al. 1999, Jones 2006; TSS 2011).

Pterostylis atriola is relatively well-reserved with subpopulations present in the Snug Tiers Nature Recreation Area (type location), Holwell Gorge State Reserve, Southwest National Park, Douglas-Apsley National Park, Mount Montgomery State Reserve, and Wye River State Reserve.

The linear range of the species is about 300 km and the extent of occurrence about 31,500 km^2 (TSS 2011). Current estimates suggest that the total population size of *Pterostylis atriola* is in the low 1,000s, up from 120 to 130 mature individuals when the species was listed in 2001 (TSS 2011). Estimates of the areas occupied by the species vary from just a few hectares to 10s of hectares (TSS 2011).

Background to Monitoring Project

The present paper reports on the response of *Pterostylis atriola* to forestry-related disturbance events, primarily at the two disjunct localities (near Railton in the State's central north, and Wielangta in the State's east), following several years of monitoring.

Effective management of forest-dependent species considered to be threatened requires appropriate knowledge of the distribution and habitat of the species, and response of the species to different forms of disturbance, whether natural (e.g. wildfire) or anthropogenic (e.g. native forest silviculture). In Tasmania, there is a building picture of the degree of risk forestry practices present to forest-dependent vascular flora. While some species with highly localised and disjunct distributions may be threatened by forestry activities, evidence is pointing to many forest-dependent species being resilient and robust to forms of disturbance from forestry activities. For example, *Ehrharta juncea* (Poaceae, forest wiregrass, syn. *Tetrarrhena juncea*) and *Pimelea filiformis* (Thymelaeaceae, trailing riceflower) were both delisted because studies showed these species to occur in monoculture plantations, sites subject to clearfell-burn-sow native

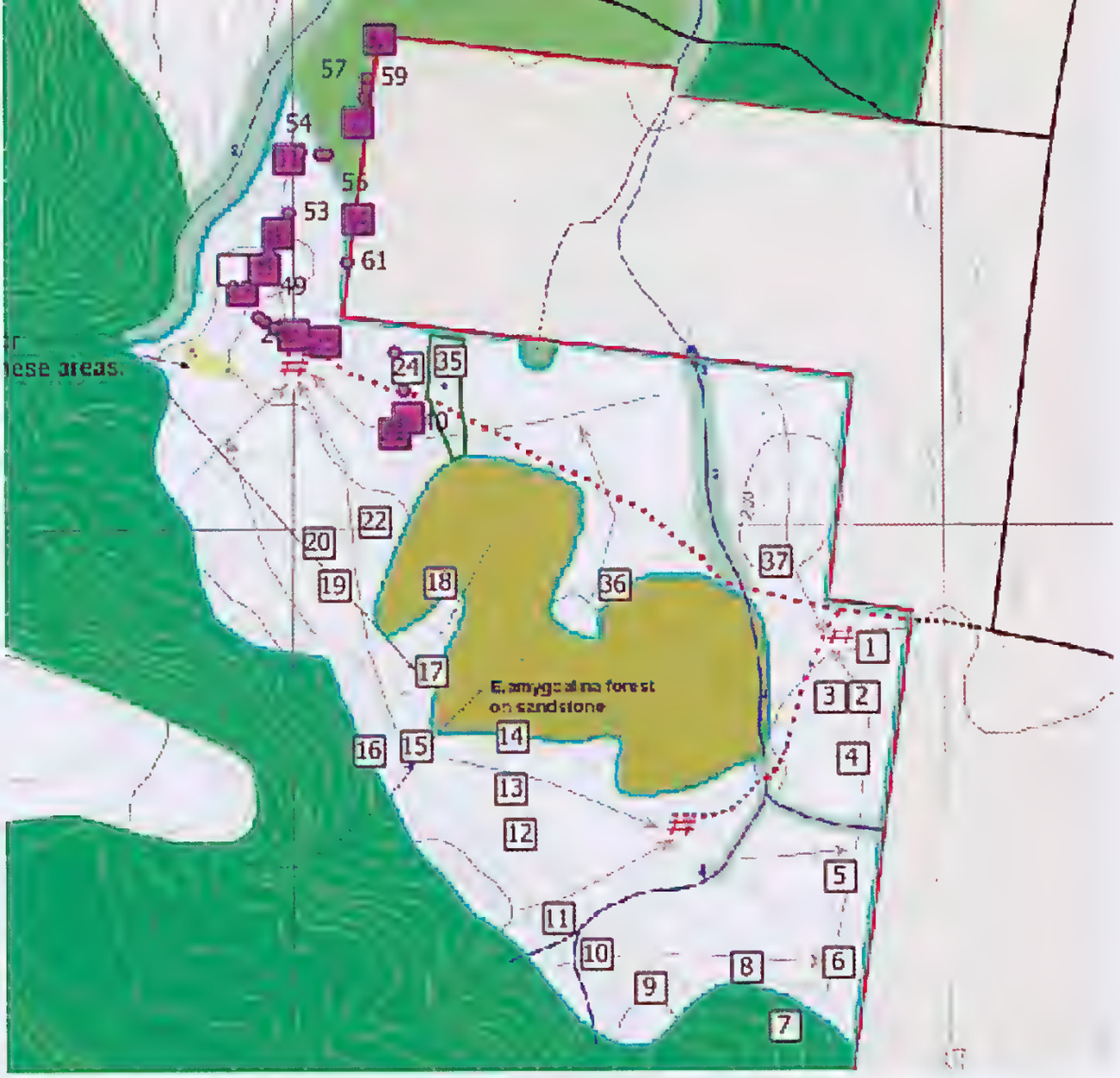

Figure 2. Extract of Forest Practices Plan map with monitoring quadrats indicated (solid squares = positive; hollow squares = negative; solid points = miscellaneous additional plants).

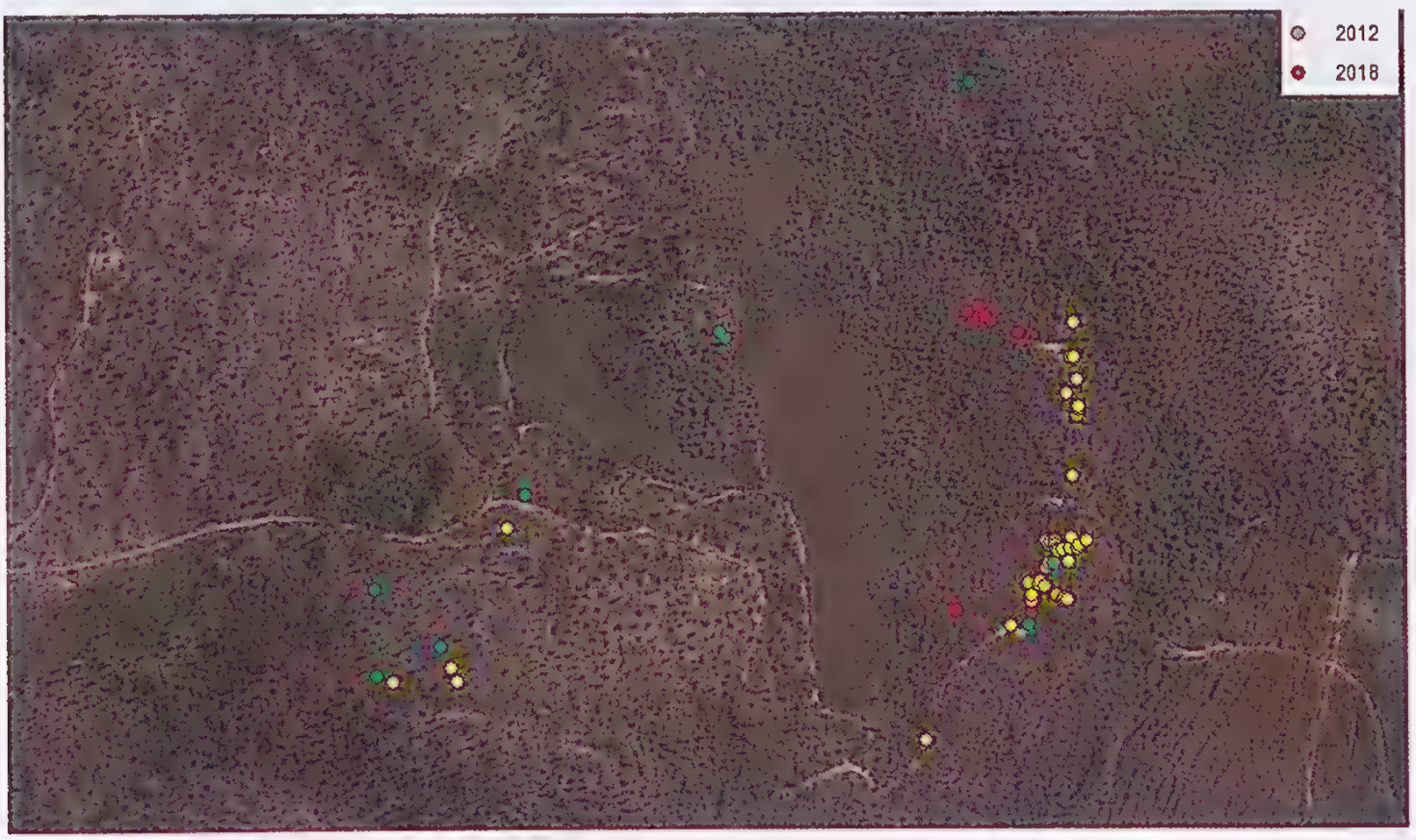

Figure 3. Distribution of *Pterostylis atriola* in and around WT009B.

forest silviculture and sites subject to different forms of selective timber harvesting (Wapstra et al. 2002; Wapstra et al. 2005). Research demonstrated that an endemic wattle (*Acacia pataczekii*, wallys wattle) was not deleteriously affected by selective timber harvesting but that special management of stands of over-mature individuals of the species was warranted (Chuter et al. 2015).

Within the Tasmanian native orchid flora, the degree of risk posed to populations of different species by forestry practices varies enormously. It is, however, not a reasonable assumption that all forestry practices are deleterious. For example, a study into the distribution, habitat and impacts of forestry practices on *Prasophyllum stellatum* (ben lomond leek-orchid), a species listed as endangered on both State and Commonwealth legislation, clearly demonstrated that while the species has a highly localised distribution and relatively small population abundance, native forest silviculture did not appear to a significant threat (Wapstra et al. 2011).

In 2007, a native forest silviculture coupe (BG034A) was proposed on State forest (i.e. public land) in the catchment of Caroline Creek near Railton in the State's central north (Figure 1). Under the Tasmanian forest practices system, Forest Practices Plans must be certified by a Forest Practices Officer as being in accordance with the provisions of the *Forest Practices Code* (the Code) (FPA 2017). Threatened flora and fauna species must be taken into account under Section D of the Code. A set of *Procedures for the Management of Threatened Species under the Forest Practices System* has been established between the Forest Practices Authority (FPA) and the Department of Primary Industries, Parks, Water & Environment (DPIPWE). These require the application of endorsed management recommendations for a species where it may be affected by production forestry, or in the absence of these, consultation between the FPA and DPIPWE to develop case-by-case management actions. In the case of BG034A, local knowledge resulted in the land manager (then Forestry Tasmania, now Sustainable Timber Tasmania) being made aware of the presence of *Pterostylis atriola* in the area proposed for timber harvesting. This set in motion a series of assessments and establishment of a semi-formal long-term monitoring project examining the response of the species to native forest silviculture (ECO*tas* 2007, 2008). There was strong local opposition to the timber harvesting proposal, centred on the assumed impact on the then Commonwealth- and State-listed species (e.g. Bradburn 2008; Stephenson 2008). Prior to this, *Pterostylis atriola* had been found in State forest in the Wielangta area on the State's east coast, reported from sites subject to previous clearfell-burn-sow native forest silviculture, as well as sites only lightly disturbed by selective timber harvesting, suggesting that a form of selective native forest silviculture as proposed in BG034A would be tolerated by the species.

Observations

Two major study sites are described (timber harvesting coupe BG034A near Railton, and several coupes in the Wielangta area on the State's east coast), although information is also drawn from database information, consultation with several observers (see Acknowledgements) and additional surveys by the first author between 1998 and the present. Virtually all subpopulations have been observed in the field.

Table 1. Status of Tasmania's native orchid flora on State and Commonwealth legislation

[EPBCA = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: VU = Vulnerable, EN = Endangered, CR = Critically Endangered, EX = Extinct; TSPA = Tasmanian *Threatened Species Protection Act 1999*: r = rare, v = vulnerable, e = endangered; x = presumed extinct]

Status	EPBCA	TSPA
-/r	-	13
VU/v	4	8
EN/e	10	55
CR/-	25	-
EX/x	1	2
Total	**40**	**78**

Plate 3. Location of positive quadrat 29 prior to forest harvesting in BG034A: *Pterostylis atriola* occurred on the margins of the walking and horse-riding trail and in the adjacent shrubby understorey (20 Feb. 2008: M. Wapstra).

Plate 4. Approximately the same site as Plate 3 in February 2011, showing post-harvest habitat of *Pterostylis atriola*: the species was scattered amongst the felled debris (18 Feb. 2012: F. Duncan)

Plate 5. Approximately the same site as Plates 3 & 4 showing the very dense development of a shrub and bracken understorey (12 Feb. 2018: M. Wapstra)

CoupeBG034A, Railton

BG034A comprised c. 50 ha of native forest dominated by *Eucalyptus obliqua* (stringybark) and *Eucalyptus amygdalina* (black peppermint) with a shrubby understorey. The area had been long-used for recreation such as horse riding and trail bike riding. The area had also been mined with several deep shafts present. Typical of most accessible forest close to major settlements, the forest had been cut-over previously and was best described as mature regrowth. For various reasons, the original c. 50 ha provisional coupe was reduced to c. 30 ha after exclusion of a large area in the northern and central parts of the coupe, as well as streamside reserves (Figure 2). For the purposes of this research BG034A was divided into four zones: the harvest zone, the *Pterostylis atriola* management zone, the *Eucalyptus amygdalina* on sandstone management zone, and outside the coupe zone.

Following surveys of the coupe, documented in ECO*tas* (2008), permanent 10 x 10 m quadrats were established in part of the coupe (Figure 2). Thirty-seven quadrats were established: twenty-six were designated as negative (*Pterostylis atriola* absent) and eleven as positive (*Pterostylis atriola* present). Of the negative plots, twenty-one were located in the harvest zone, two outside the coupe (quadrat 7 is well outside the coupe and quadrat 16 is shown spatially as just inside the coupe but on ground is outside the boundary), one inside the *Pterostylis atriola* management zone, and two within the *E. amygdalina* on sandstone management zone. Two of the quadrats shown on the map as within the harvest zone were actually within in-coupe exclusion areas: quadrat 10 was within the streamside reserve and quadrat 13 was within the exclusion area around a deep pit. Of the positive quadrats, eight were within the harvest zone. Two were located within the *Pterostylis atriola* management zone close to the private reserve boundary (note that the map may show the quadrats on or even within the private property boundary but the plots were within zones).

Following the establishment of the monitoring quadrats, the site was surveyed on seven occasions (Table 2). Several aspects of the findings warrant further comment. First, the timing of the survey is important but need not necessarily be on the same date each year. This species seems to appear very quickly: in 2018, informal reports early in February indicated the species was absent from the unharvested part of BG034A (the part of the slope where the species was most consistently present) but only a few weeks later, over 60 individuals were detected. Second, re-locating some quadrats and individual plants post-harvest amongst the ever-increasing dense shrubby understorey was difficult and estimates of abundance in later years may partially reflect this. Third, emphasis on the response of individual plants to disturbance may not be appropriate for a site such as BG034A – it may be more appropriate to examine the broader population-level impacts by wider surveys and greater coverage of harvested and unharvested sites.

The conclusion from several years of monitoring is that there has been a decline in the abundance of *Pterostylis atriola* within the harvested part of BG034A but that the abundance in the adjacent unharvested area has remained relatively high. However, the abundance in both harvested and unharvested areas seems to fluctuate, perhaps largely due to seasonal conditions. While it seems reasonable to conclude that forest harvesting and regeneration has had an impact on *Pterostylis atriola*, to what degree this may be a relatively short-term temporal effect is not known. Further monitoring in BG034A will almost certainly elucidate this to some degree, although annual monitoring is not necessarily considered a wise use of resources in this case. The next monitoring event is recommended to occur in c. 5 years or 1-2 years after the next wildfire, which will hopefully open up the understorey. A less frequent monitoring regime is likely to elucidate more meaningful information on long-term influences of climate change, as well as provide some insight into the long-term persistence of tubers in periods of less favourable growing conditions.

Wielangta State forest (various sites)

Pterostylis atriola was first detected in Wielangta State forest in 2002, when a consultant botanist was assessing provisional forestry coupes and a possible forestry road. This triggered extensive

Plate 6. Even-aged *Eucalyptus delegatensis-Eucalyptus obliqua* forest regenerating from clearfelling in 1977(WT003C): *Pterostylis atriola* was scattered amongst the healthy stems and right next to cut stumps (16 Feb. 2018: M. Wapstra)

Plate 7. Selectively harvested *Eucalyptus obliqua-Eucalyptus amygdalina* shrubby forest on Jurassic dolerite at WT008A: this shows the harvested area that was burnt post-harvest as part of the forestry activity and then subject to a severe wildfire (16 Feb. 2013: M. Wapstra)

Plate 8. Site subject to relatively intensive native forest silviculture on Wielangta Hill (WT017E): *Pterostylis atriola* is scattered amongst the dense eucalypt regeneration on the old log landing site in the middle of the image (9 Mar. 2015: M. Wapstra)

surveys of several harvested and unharvested sites during 2002. Some of these sites have been informally re-visited between 2002 and 2018, although no formal monitoring sites were established. Table 3 provides a brief summary of sites and extent and abundance of *Pterostylis atriola*.

The collecting history in the Wielangta area suggests that the species is likely to be substantially more widespread, with additional sites being detected every few years. The sites are within a wide range of forest ages from essentially old-growth forest with little anthropogenic disturbance through to road verges and even-aged clearfelled forests. The abundance and extent at any particular site varies between years but this may the result of several factors including seasonal conditions and timing of survey, making it hard to draw firm conclusions on the relative impact of different forms of native forest silviculture.

Discussion

Response to native forest silviculture

Pterostylis atriola has now been found in several areas that have been subject to commercial wood production in native forests. In fact, the type location of Snug Tiers has a very long history of timber harvesting with the area supporting several sawmills until the late 1960s, at which time commercial timber harvesting was effectively halted by the intensive 1967 bushfire. This created even-aged regrowth eucalypt forest, dissected by numerous old forestry roads and tracks (Plate 9). It was thought that *Pterostylis atriola* preferred the margin of these tracks, now used largely for fire management and recreational four-wheel-driving, but it has since been recorded from adjacent denser forest (M. Wells & P. Fehre pers. comm.).

Sites in Wielangta on the east coast are from two different ages (1993 & 1977) of clearfell-burn-sow silviculture (i.e. sites subject to intensive native forest silviculture involving the complete removal of the canopy, followed by a high intensity regeneration burn to allow for aerial sowing of locally collected eucalypt seed). Additional sites in the Wielangta area where the species occurs have been subject to less intensive native forest silviculture. We also know that *Pterostylis atriola* occurs in more mature forest in the Wielangta area such as on Wielangta Hill. The distribution and abundance of *Pterostylis atriola* prior to forestry activities is not known. It is clear that the species either persisted during the disturbance event and/or subsequently colonised the sites. The species occurs in some of the most intensively disturbed parts of some of these sites, including along the verges of the old roads (and sometimes the muddy pavement of the track). At some sites (e.g. WT008A), the abundance appears to have declined, although the species was never particular abundant making comparisons of years difficult. At WT008A, it may be the combination of timber harvesting and a follow-up top disposal burn closely followed by a wildfire which has made the site unsuitable, at least for the present, as it is now densely shrubby and dominated by bracken.

Within BG034A, the coupe subject to more formal monitoring, the story of how *Pterostylis atriola* has responded to forestry activities is somewhat complex. The harvested area still supports a population of the species, although the number of sites and abundance is markedly less than prior to timber harvesting. In 2011 (i.e. 2 years after harvesting was completed), the species was present in most of the previously positive quadrats and also reported from several additional sites within the harvested area. It also remained within the unharvested area. By 2018, the number of plants within the harvested area appears to have dropped to five individuals, and by 2019 to just two individuals. On the surface this may be some cause for concern but as in WT008A, BG034A has become densely shrubby and locally dominated by bracken. In BG034A, it appears to be the lack of fire causing this understorey density. From an ecological perspective, the forest structure is very young and not ideal for terrestrial orchids. It is assumed that a species such as *Pterostylis atriola* needs more time for the overstorey canopy to mature and spread and the understorey to naturally thin out, creating gaps for herbs. It is also possible that drought conditions and unusually "hot" summers in recent years has contributed to the overall lower abundance of *Pterostylis atriola* in the harvested area, although the strength of this factor is reduced by the fact that the species has maintained a reasonable abundance in adjacent

Table 2. Summary of monitoring in BG034A.

Date	Action	Observations
20 Feb. **2008** [Plate 3]	Pre-harvest establishment of monitoring quadrats. 37 10 x 10 m quadrats established across BG034A: 26 negative and 11 positive.	**68** individuals inside the 10 x 10 m quadrats and **14** additional individuals just outside the formal quadrats (total = **82** individuals). An additional 25 point locations representing **80** additional individuals were recorded from outside the quadrats. The total number of individuals recorded on 20 Feb. 2008 was **162**.
Apr. **2009**	Brief reconnaissance (in April) by DPIPWE but without reference to quadrat data and no initial site familiarity .	No individuals detected but the brief and late in the season survey was not adequate to detect the scattered population of the species. The "dry season" was noted, however, and this may have contributed to the apparent absence of the species.
18 Feb. **2011** [Plate 4]	c. 3 years post-harvest – first formal monitoring. 29 of the 37 quadrats were re-sampled. Of the 26 originally negative quadrats, 19 were re-sampled and 7 were not re-sampled. Of the 11 originally positive quadrats, 10 were re-sampled and 1 was not re-sampled.	All re-sampled negative quadrats remained negative for the species. 9 of 10 re-sampled positive quadrats remained positive for the species, with **59** individuals inside the 10 x 10 m quadrats and **15** additional individuals just outside the formal quadrats (total = **74** individuals). An additional 12 point locations representing **47** additional individuals were recorded from outside the quadrats. The total number of individuals recorded on 18 Feb. 2011 was **121**. It was obvious to all present that the species was still present throughout the logged and unlogged areas. Several individuals were found growing in the middle of snig tracks and on landings, as well as immediately adjacent to cut stumps. The understorey throughout the logged areas was still fairly open.
13 Feb. **2012**	Informal survey of the site by local enthusiasts (P. Tonelli pers. comm.).	Informal report: "no signs of *P. atriola* even in the un-harvested area where they have been in years past" (P. Tonelli pers. comm.). Response: "Might be a bad year – I went up to Snug Tiers yesterday and found a measly 2 (both in flower), not an intensive search but would have expected more by this time".What is most interesting from these informal observations in BG034A is that the species was not in either the logged or unlogged areas i.e. the absence is much more likely to be a result of seasonal conditions than the disturbance event.
21 Feb. **2014**	Opportunistic monitoring event by M. Wapstra. All the originally positive quadrats were re-located and scored. None of the originally negative quadrats were re-located.	Only 2 quadrats were found to be positive; one with **22** individuals within the quadrat and **4** just outside the quadrat (total **26**) and one with **3** individuals within the quadrat. The total number of individuals within and just outside quadrats was **29**. An additional 4 point locations representing **4** additional individuals were recorded from outside the quadrats. The total number of individuals recorded on 21 Feb. 2014 was **33**. Note that this total number is lower than previous years but this monitoring effort was focused only on quadrat locations and no deliberate effort was made to find additional plants elsewhere (time was limited). All re-located individuals are from within the unharvested areas, although several sites are still associated with old tracks and there is evidence of continued horse-riding. The harvested areas are now very dense with bracken and shrubs and virtually impenetrable in many places.
6 Mar. **2015**	Serendipitous and very informal survey of part of BG034A, focusing on the main area covered by the positive monitoring quadrats. No effort was made to re-locate quadrats (GPS data points were not available on this field trip, undertaken by convenience while in the general area). Survey took the form of wandering along tracks and through the generally easier to negotiate understorey. Approximately. 2 hours was spent on site.	*Pterostylis atriola* remains widespread in the logged areas. Abundance seems to be low with **14** individuals recorded, most at full anthesis, some in bud and some fertilised. The species remains present in logged and unlogged areas, including on track verges and on one of the old landing sites.
13 Feb. **2018** & 18 Apr. **2018** [Plate 5]	Monitoring event by M. Wapstra. All the originally positive quadrats were re-located and scored. None of the originally negative quadrats were re-located. In addition, information was received from local orchid enthusiasts who informally assessed the unharvested (northern) part of BG034A on 15 Feb. 2018 & 3 Mar. 2018.	3 Feb. 2018: 2 individuals at 2 positive quadrats within the unharvested part of BG034A (northern area). 18 Apr. 2018: 20 individuals, 15 in the same general area as those reported on 13 Feb. 2018 and 5 individuals from the harvested area. Total in 2018: **20**. Informal monitoring on 15 Feb. 2018: none. Informal monitoring on 3 Mar. 2018: 65 at 9 sites. Total in 2018: **65**.
12 Mar. **2019**	Informal survey of the site by local enthusiasts (Neale & Jill Colgrave pers. comm.).	Approximately 3 hours of searching, mainly in the harvested areas (quadrats 23 and 25-31) and some of the reserved areas (quadrats 32-34) – **2** individuals in logged areas next to tracks where there was less bracken and little overhead cover, and **20** in the reserved area.

Table 3. Summary of populations of *Pterostylis atriola* in the Wielangta area.

Coupe	Silvicultural age	Observations
WT009B [Figure 3]	Clearfelled and regenerated (high intensity burn and aerial sowing) in 1993, with relatively well-formed forestry track/ road through middle.	15 Mar. **2002**: original detection of species from this part of State with **33** individuals at 3 sites along verge of old forestry road detected. 25 Feb. **2011**: general surveys of the general area but no real attempt to re-locate original point locations (which were never particularly precise) – total of **117** plants at 37 sites, mainly along the verges of the old track but also scattered through the adjacent forest. 16 Feb. **2018**: **33** plants at 26 localised sites (survey not extensive).
WT008A [Plate 6]	Originally shrubby *Eucalyptus obliqua-Eucalyptus amygdalina* forest on a Jurassic dolerite rocky slope. Subject to seed tree retention and advance growth retention native forest silviculture between 5 Jul. 2004 and 4 Apr. 2005. This was followed by a top disposal burn on 16 Apr. 2006. The area was then burnt by a relatively severe wildfire between 5 Dec. 2006 and 10 Jan. 2007 (V. Thompson pers. comm.).	15 Mar. **2002**: original detection of species from this part of State with **19** individuals at four sites. 25 Feb. **2011**: surveys of the general area and an attempt to re-locate original point locations (which were never particularly precise) - one plant on the logged ridge track (close to the original), two plants on the actual ridgeline (new sites), and four on the lower slope near the original dirt track (but in a logged area), giving a total of **six** plants. 16 Feb. **2018**: **0** plants (original sites all re-located and wider survey undertaken).
WT007B	Informal survey of sites in the Wielangta area (M. Wapstra), which included this coupe that comprised relatively young regrowth from harvesting in 1993.	26 Feb. **2012**: **three** plants on old logging track. 16 Feb. **2018**: **eight** plants at 6 localised sites (survey not extensive).
WT003C [Plate 7]	Clearfelled and regenerated (high intensity burn and aerial sowing) in 1977. Opportunistic extension survey.	16 Feb. **2018**: **11** plants at 11 localised sites (survey not extensive).
WT019E	Open rocky eucalypt forest – unharvested (only disturbance is fires and old forestry tracks).	7 Aug. **2008**: **one** old plant picked up in undisturbed part of forest.
WT019D	Open rocky eucalypt forest – unharvested (only disturbance is fires and old forestry tracks).	10 Sep. **2008**: **one** old plant picked up in undisturbed part of forest. 25 Feb. **2011**: general surveys of undisturbed forest and along verges of track – three sites with total of **10** plants on verge of track.
WT017E [Plate 8]	Originally unharvested (except highly selectively) eucalypt forest. Harvested and regenerated in 2005.	25 Feb. **2011**: 2 sites (**3+3** individuals) in the skyline reserve above the road; and 6 sites in the adjacent logged (close to clearfell) area with 1, 2, 4, 1, 9 and 1 plants (i.e. **18**), respectively (some growing on the most disturbed vegetation possible, amongst logging debris and small gaps in the low and dense regrowth canopy. This site was not known pre-harvest so not many conclusions can really be drawn, except that the species occurs in a recently logged area.

unharvested forest. It may be that the denser canopy cover provides a cushion to the harsher seasonal conditions, allowing a marginally milder near-ground microclimate.

It will be interesting to continue to monitor the progress of *Pterostylis atriola* at BG034A and sites within Wielangta, supplemented with other locations. It is highly likely that the populations not only fluctuate with the time since disturbance but also with seasonal and annual weather patterns.

Conservation status

At present, *Pterostylis atriola* is listed as rare (Schedule 5) on the Tasmanian *Threatened Species Protection Act 1995* (the Act), apparently meeting criterion B in that "the total population consists of fewer than 10,000 mature individuals and no more than 2,500 mature individuals occur on land that is in an area free from sudden processes capable of causing largely irreversible loss of individuals or habitat" (TSS 2011). The present paper does not dispute the estimates of mature individuals presented in TSS (2011) but does question the validity of listing the species in the absence of identifiable threats. The species is now recognised to be widespread, represented by c. 16 subpopulations, some of which support hundreds to even thousands of mature individuals over sometimes quite extensive areas, and present in several formal reserves.

The Scientific Advisory Committee (SAC), established under the provisions of the Act, published *Guidelines for Eligibility for Listing under the Threatened Species Protection Act 1995*, which were updated in 2008 (DPIW 2008). The Act states that "a taxon of native flora or fauna may be listed as rare if it has a small population in Tasmania that is not endangered or vulnerable but is at risk". The *Guidelines* provide a set of criteria that are used to assess whether a species qualifies in this category. The critical term in both the Act and the *Guidelines* is "at risk". TSS (2011) identified forestry activities as a potential threat to *Pterostylis atriola* but noted that the specific effect of such activities on the species is not known, although it is highly unlikely the species would persist within monoculture plantations. Conversion of native forest to plantation has effectively ceased within the range of the species and there is limited evidence that extensive areas that may have once supported the species were converted historically. The present paper has clearly

Plate 9. Shrubby *Eucalyptus delegatensis* forest (even-aged regrowth from previous intensive sawmilling and severe wildfire in 1967) on Snug Tiers: *Pterostylis atriola* grows on the immediate verge of this well-used track and also scattered through the adjacent shrubby forest (13 Feb. 2012: M. Wapstra)

demonstrated that *Pterostylis atriola* persists in areas subject to older forms of clearfell-burn-sow forestry and more modern silvicultural practices. Except at a highly localised and short-term temporal scale, it appears that native forest silviculture does not put *Pterostylis atriola* "at risk" of moving from rare to a higher conservation status. However, we recommend taking a cautionary approach, retaining the species as rare on the Tasmanian *Threatened Species Protection Act 1995*, pending longer-term monitoring.

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Intergeneric Australian and Australasian *Aeridinae* Hybrids

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Introduction

The idea of crossing *Sarcochilus* with other *Aeridinae* species is not new. One of Ira Butler's first crosses was *Sarcochilus hartmannii* x *Rhinerrhiza divitiflora*, which he registered as *Rhinochilus* Dorothy in 1965. Frank Simpson is well known for the interesting novelty *Aeridinae* crosses he made with species such as *Sarcochilus spathulatus*. He presented a paper on novelty *Sarcochilus* breeding at the 4th ANOS Conference in Melbourne in 2000 in which he discussed the work done up to that time with *Rhinerrhiza divitiflora, Peristeranthus hillii, Rhinerrhizopsis moorei, Sarcochilus spathulatus, Sarcochilus hirticalcar, Plectorrhiza tridentata, Plectorrhiza brevilabris, Plectorrhiza erecta, Pomatocalpa macphersonii* and *Phalaenopsis amabilis*. He said that *Saccolabiopsis armitii, Papillilabium beckleri, Mobilabium hamatum, Schistotylus purpuratus, Trichoglottis australiensis* and *Vanda hindsii* held promise for future hybridising.

Frank spoke highly of *Rhinerrhiza divitiflora* and its progeny and the prospects for further hybrids with it. There have been nine first generation *Rhinerrhiza divitiflora* hybrids registered and the species has a total of 30 progeny, but I am not going to discuss those hybrids here, or deal with *Phalaenopsis amabilis*. Some pretty hybrids have been made between *Sarcochilus* and *Phalaenopsis amabilis*, but unless the *Phalaenopsis amabilis* used is subspecies *rosenstromii*, which is the name currently accepted by Kew (WCSP) for the taxon which occurs in New Guinea and Australia, the hybrids are not even Australasian, much less Australian. I will concentrate on hybrids which include *Peristeranthus hillii* and *Plectorrhiza* species, and some miscellaneous other epiphytic *Aeridinae* species.

Peristeranthus hillii

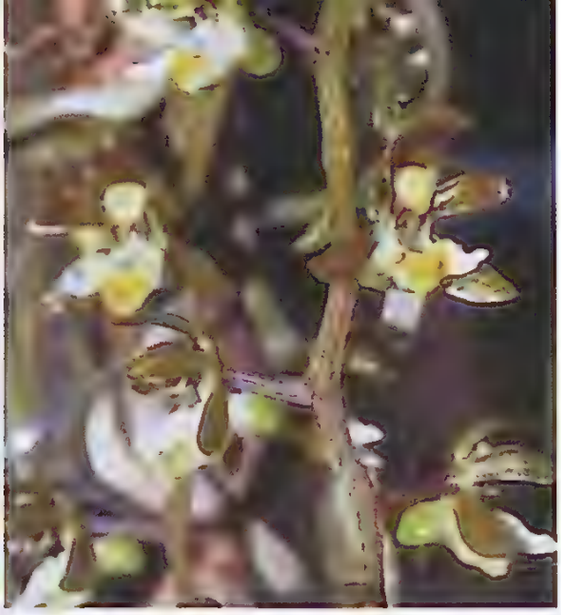
The genus name is from the Greek *peristera,* dove, and *anthos*, flower, implying the flowers somehow resemble a dove. The specific epithet honours Walter Hill, first curator of the Brisbane Botanic Gardens. The epiphytic species occurs from the Bloomfield River area of far north Queensland down the east coast to Port Macquarie area in New South Wales. It grows in coastal lowland rainforest at the lower end of its range and higher altitude rainforest at the north. It is a threatened species listed as Vulnerable in NSW, but cultivated seedlings are sometimes available in flask. It is fairly easy to grow if provided with a suitable mount and high humidity, shade, air movement and regular watering throughout the year. It has pendulous racemes of fragrant flowers which though small (5–7 mm wide and 6–8 mm long) are numerous and all flowers on the raceme tend to open at the same time. The flowers are pale green to yellow, heavily overlaid with numerous red or purple blotches.

Frank Simpson crossed this species with *Sarcochilus falcatus*, and registered the grex as *Peristerchilus* Olive Grace in 1996. That cross has produced some charming, floriferous, long-lived plants which have received a number of quality and cultural awards.

In recent years, Colin Fitzsimmons has been doing work with novelty hybrids. In 2011 he crossed *Peristeranthus hillii* with *Sarcochilus* Melody. The seed produced only one protocorm but Col replated it and the result was a plant with attractive red flowers 13 mm wide and up to 30 flowers on a raceme. He registered the grex as *Peristerchilus* Belmont Magic. Col crossed *Prschs.* Olive Grace back to *Sarcochilus falcatus* and registered the result as *Prschs.* Memoria Iris

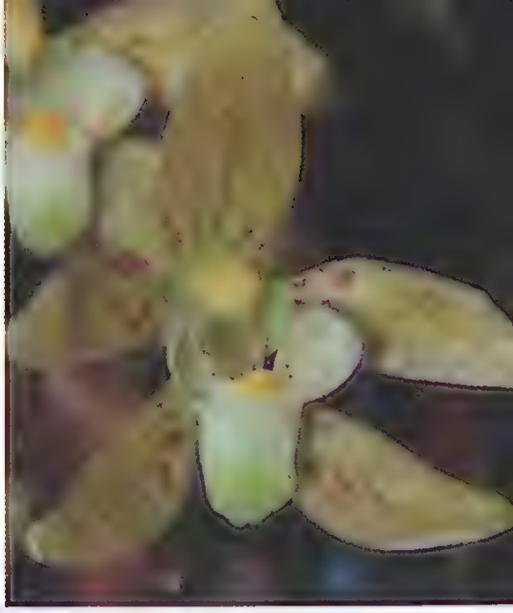
Table 1 *Peristeranthus hillii* Hybrids.

Year	*Peristerchilus*	Parentage	Originator
1996	Olive Grace	*S. falcatus* x *Perths. hillii*	Simpson Orchids
2014	Memoria Iris Pendle	*S. falcatus* x *Prschs.* Olive Grace	C.W. Fitzsimmons
2015	Cherub	*S.* Elise x *Perths. hillii*	D.F. Butler
2015	Belmont Magic	*S.* Melody x *Perths. hillii*	C.W. Fitsimmons



Plectorrhiza tridentata

Plectorrhiza tridentata flower

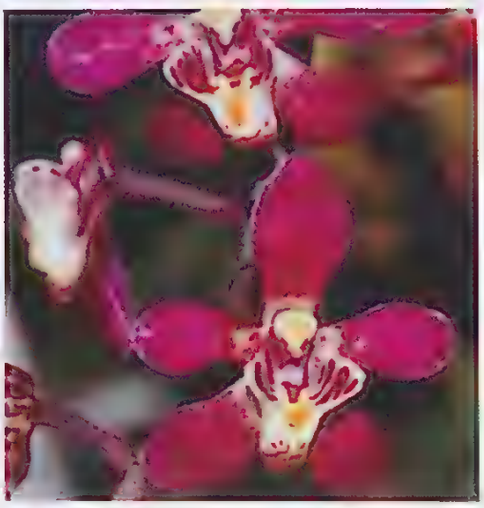


Plectochilus Kilgra

Plectochilus Harlequin 'Moonlight' HCC/ANOS 2013

Plectochilus Richard Jost

Plectochilus Jester



Plectochilus Tribob 'Claret'

Plectochilus Elise Rose
Photo Col Fitzsimmons

Pendle. Iris Pendle was a *Sarcochilus* enthusiast from Sydney's lower North Shore and well known at ANOS Warringah Group for her love of *Sarcochilus*. I think Iris would be delighted to see this orchid named in her honour and especially happy to see one receive an Award of Merit and an Award of Cultural Commendation from the Australian Orchid Council last November. That plant, *Prschs*. Mem. Iris Pendle 'Roslyn Joyce', owned by David Knight, had seven inflorescences with a total of 107 flowers (29 on the main inflorescence). The flowers were 12mm x 15mm, and white with red-purple spots.

David Butler crossed *Peristeranthus hilli* with *Sarco.* Elise 'Plum' and the resulting *Prschs.* Cherub produces very pretty flowers in a shape and colour which reflects the combination of *Peristeranthus hillii* (50%) and *Sarcochilus ceciliae* (25%). *Sarcochilus fitzgeraldii* also contributed (12.5%) and looking at the flowers that species' presence is not a surprise, but I discern nothing in the appearance of those I have seen to suggest *Sarcochilus hirticalcar* (12.5%). However, that species no doubt contributes to the hybrid's inclination to flower during the first half of the year as well as in the main *Sarcochilus* season. A list of registered *Peristeranthus hillii* hybrids is contained in Table 1.

Plectorrhiza tridentata

The genus name is from the Greek *plektos* meaning plaited or twisted, and *rhiza* meaning root, referring to the tangled roots. The specific epithet means "with three teeth", referring to the labellum.

This epiphytic (occasionally lithophytic) species is widespread and common throughout its range and occurs in humid rainforest from the Mt Windsor Tableland in north Queensland down the east coast through New South Wales and into north-eastern Victoria. It is known for its mass of tangled roots, the plant often hanging from a branch or twig, only attached to the host by one or two roots. It has pendulous racemes of 3–15 fragrant flowers, 6–8 mm wide and 5–6

Table 2 *Plectorrhiza tridentata* Hybrids.

Year	Gen.	Grex	Parentage	Originator
1976	1	*Plchs.* Richard Jost	*S. hartmannii* x *Plrhz. tridentata*	J. Rumrill
1976	1	*Plchs.* Rumrill	*S. ceciliae* x *Plrhz. tridentata*	J. Rumrill
1988	1	*Plchs.* Kilgra	*S. falcatus* x *Plrhz. tridentata*	S. Penman
1994	1	*Plchs.* Lynore	*S.* Mavis x *Plrhz. tridentata*	W.T. Upton
1996	1	*Plchs.* Longwarry	*Plrhz. tridentata* x *S.* Heidi	G. Hicks
2008	1	*Plchs.* Nellie's Baby	*S.* Melba x *Plrhz. tridentata*	R. Clement
1997	1	*Plchs.* Yabbie	*S.* Sue x *Plrhz. tridentata*	P.D. Campbell
1998	1	*Plchs.* Jayme Beau	*Plrhz. tridentata* x *S.* Kathy	Simpson Orchids
1998	2	*Plchs.* Duno Tusk	*Plchs.* Kilgra x *S.* Lotus	DUNO
1999	2	*Plchs.* Harlequin	*S. hartmannii* x *Plchs.* Richard Jost	D.F. Butler
2002	1	*Plchs.* Flute	*S.* Opal x *Plrhz. tridentata*	N. Roper
2002	1	*Plchs.* Gem	*S.* Pinkhart x *Plrhz. tridentata*	K. Russell
2005	1	*Plchs.* Zelda	*S.* Jeanne x *Plrhz. tridentata*	N. Roper
2008	1	*Plchs.* Tribob	*S.* Bobby-Dazzler x *Plrhz. tridentata*	N. Roper
2009	2	*Plchs.* Dainty Dame	*Plchs.* Richard Jost x *S.* Heidi	P. Spence
2011	1	*Plchs.* Delta	*S.* Riverdene x *Plrhz. tridentata*	N. Roper
2013	3	*Plchs.* Jester	*Plchs.* Harlequin x *S. hartmannii*	D.F. Butler
2013	4	*Plchs.* Larrikin	*Plchs.* Jester x *S. australis*	B. Larkin
2014	1	*Plchs.* Ian Peter	*S.* Burgundy on Ice x*Plrhz. tridentata*	J. Dunn
2014	1	*Plchs.* Victorata	*S.* Victoria x *Plrhz. tridentata*	C.W. Fitzsimmons
2015	1	*Plchs.* Andy Wicks	*S. spathulatus* x *Plrhz. tridentata*	T. Muralitharan
2015	4	*Plchs.* Sunset	*S.* Roberta x *Plchs.* Jester	C.W. Fitzsimmons
2015	3	*Plchs.* Charisma	*Plchs.* Harlequin x *S.* Heidi	D.F. Butler
2016	3	*Plchs.* Merrymaker	*Plchs.* Harlequin x *S.* George Colthup	D.F. Butler
2017	1	*Plchs.*Orkology Trimaran	*S.* Marina Harriott x *Plrhz.tridentata*	G. Steenbeeke
2017	1	*Plchs.* Scallywag	*S.* Duno Nicky's Twin x *Plrhz. tridentata*	D.F. Butler
2018	2	*Plchs.* Austral Triumph	*Plchs.* Rumrill x *S. australis*	Anderson

mm long, in green or brown with a prominent white labellum. It is easy to cultivate on a mount and there have been some cultural awards, though few growers can produce an exhibit as impressive as master-grower Fred Fear's *Plectorrhiza tridentata* 'Margaret' for which Fred received cultural awards from both the AOC (2015) and ANOS (2008).

Plectorrhiza tridentata hybrids have become popular and registrations are increasing; some are into the fourth generation. There are now 27 registered hybrids with this species and *Sarcochilus* (Table 2). A noteworthy recent addition is the hybrid between *Sarco.* Marina Harriott and *Plectorrhiza tridentata* made by Greg Steenbeeke which he registered as *Plectochilus* Orkology Trimaran in 2017. *Sarcochilus* Marina Harriott is *S. ceciliae* x *S.* Velvet. The combination of 50% *Plectorrhiza tridentata*, 25% *Sarcochilus ceciliae*, 12.5% *Sarcochilus hirticalcar*, 6.3% *Sarcochilus fitzgeraldii* and 6.3% *Sarcochilus hartmannii* holds the promise of a range of colours, a flowering period extending over the summer and autumn, and also adaptability to pot culture. Greg has stated (pers. comm.) that the plants are precocious. Seed was flasked six months after pollination and the replates were ready to deflask at 20 months after pollination. Many had racemes at deflasking and the first flowered 22–23 months from pollination. Of about 200 plants, almost all flowered in the first 18 months. One plant was continuously in flower for that period, with three consecutive racemes which overlapped in time. Flowering is strongly sequential with usually only two flowers out at any time but each flower lasts about three weeks. Racemes average eight or so flowers but one had several more than that and was in flower for 12 months. Peak flowering is spring to early summer.

Hybrids using the two other Australian *Plectorrhiza* species have also been registered. *Plectorrhiza erecta* is an erect epiphytic and lithophytic species from Lord Howe Island, which flowers in late spring/early summer and forms straggly, erect clumps. It has 2–5 flowers, 8–10 mm long x 6–8 mm wide, yellowish-orange with numerous red-purple blotches. *Plectorrhiza brevilabris* is an epiphytic species which grows in Queensland from the McIlwraith Range to the Noosa River, and flowers November to February. It has 3–20 flowers which are 12–15 mm x 8–10 mm, green with greenish brown central patches on the tepals and a white patch on the labellum. Neil Finch crossed *Plectorrhiza tridentata* with *Plectorrhiza erecta* to impart the lithophytic nature of *Plrhz. erecta* onto *Plrhz. tridentata*. He recorded this in his 1997 Down Under Native Orchids catalogue which also stated that the plants were thriving in pots and resembled miniature vandas. One of these was crossed with *Peristeranthus hillii* by Tony Clarke and Col Fitzsimmons provided photos of two of those plants. The flowers are only small, 7 x 5 mm, but have racemes of coloured flowers in reds and

Table 3 Miscellaneous Intergeneric Hybrids

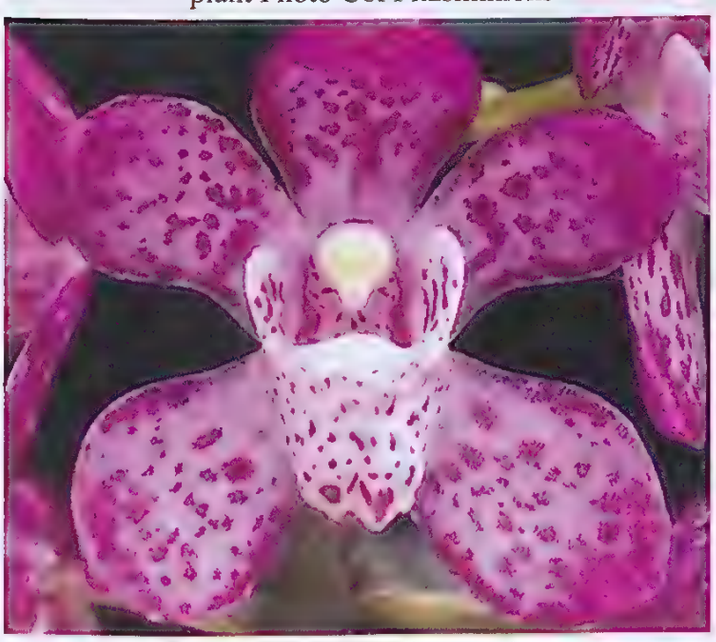
Year	Registered name	Parentage	Originator
1992	*Sarcomoanthus* (*Sran.*) *Maungatapere*	*S. fitzgeraldii x Drymoanthus* (*Dry.*) *adversus*	H. Blumhardt
1993	*Sran.* Emarcy Gem	*S. ceciliae* x *Dry. adversus*	M.R. Campbell
1995	*Sran.* Little Sparkle	*S. falcatus x Dry. adversus*	L. Dougherty
1997	*Malcolmcampbellara* (*Mcba.*) Emarcy Magenta	*Sran.* Emarcy Gem x *Plrhz. tridentata*	M.R. Campbell
1998	*Pomatochilus*(*Pmtls.*) Helga's Surprise	*Pomatocalpa (Pmcpa.) macphersonii* x *S. ceciliae*	H. Geppert
2003	*Pmtls.* Violette	*S. PinkhartxPmcpa. macphersonii*	K. Russell
2003	*Sran.* Rosey Posey	*S.* Colonial Rose x *Dry. adversus*	G. Leafberg
2009	*SarcoschistotylusTwiggy*	*S. falcatus* x *Schistotylus purpuratus*	N. Roper
2010	*Sran.* Liddy's Gem	*S.* Lorina x *Dry. adversus*	W. Liddy
2012	*Russellara* (*Rsl.*) Lucy-R	*Rhincs.* Orange Stars x *Plrhz. tridentata*	K. Russell
2012	*Papillochilus* (*Pic.*) Little Ripper	*S. australis* x *Papillilabium beckleri*	K. Kopicki
2015	*Rsl.* Belmont Surprise	*Plchs.* Jester x. *Rhincs.* Jennifer's Joy	C.W. Fitzsimmons
2015	*Pic.* Green Goblin	*S. spathulatus* x *Papillilabium beckleri*	T. Muralitharan
2015	*Plchs.* Elise Rose	*S.* Fizzy Dove x *Plrhz. erecta*	C.W. Fitzsimmons

Plectochilus Orkology Trimaran Photo G. Steenbeeke

Peristeranthus hillii

Peristerchilus Olive Grace whole plant Photo Col Fitzsimmons

Peristerchilus Cherub Photo Rob Lewry



Peristerchilus Cherub Photo Rob Lewry

Plectochilus Victorata Photo Col Fitzsimmons

yellows with varying degrees of spotting. Neil Finch also crossed *Sarco. ceciliae* with *Plrhz. erecta* to make *Plchs.* Minirose, registered in 1997. Frank Simpson crossed *Plrhz. brevilabris* with *Sarco. falcatus*, registered as *Plchs.* Brodie Vincent in 1998. In 2015, Col Fitzsimmons registered *Plchs.* Elise Rose (*Sarco.* Fizzy Dove x *Plectorrhiza erecta*).

It is sometimes not until the second generation of hybrids or even later that the decision to make a cross is justified. I would never have imagined that crossing *Plectorrhiza tridentata* with *Sarcochilus hartmannii* would have eventually resulted in the wonder that was David Butler's *Plectochilus* Harlequin 'Moonlight' AD/ANOS 2013. I first saw 'Moonlight' when it was a young plant in 2009. Sadly this orchid is no longer alive and it never produced a side growth so the only plant of it perished. Fortunately, David had successfully bred with it and produced offspring including *Plchs.* Charisma, *Plchs.* Jester and *Plchs.* Merrymaker. *Plectochilus* Jester 'Sunset' received an AD from ANOS in 2017 for its colour, and it has produced several side-growths. The colour of *Plchs.* Harlequin 'Moonlight' is less surprising when you know that the parents of Harlequin were *Plchs.* Richard Jost 'Pink Flush' and *S. hartmannii* 'Ginger Snow'. David's account of Moonlight's life and its progeny can be found in *The Orchadian* June 2018.

Other *Aeridinae* species used in registered hybrids

Some work has been done with the more eccentric crosses proposed by Frank Simpson in 2000. Table 3 lists these registered hybrids using miscellaneous *Aeridinae* species. It includes some hybrids of the New Zealand species *Drymoanthus adversus.*

Drymoanthus is a genus of four small species, two of which are endemic to New Zealand (*Dry. adversus* and *Dry. flavus*), one to New Caledonia (*Dry. minimus*), and one (*Dry. minutus*) occurring only in north-east Queensland. New Zealand's *Dry. adversus* has been used in hybridising in that country where it is a fairly widespread small epiphyte and occasional lithophyte which occurs from lowland to sub-alpine regions on both islands. It has panicles to 4 cm long with several small flowers, 3-4mm across which are greenish to white with purple to red flecks, flowering October to November. *Drymoanthus minutus*, which is endemic to north east Queensland, is similar though a smaller plant. The racemes are 10–25 mm long and the 1–7 flowers are 2–2.5 mm wide. Frank Simpson did not mention this species in his list of potential parents, and its size will probably preclude it from being used, but maybe someone will try, if only to capture the lovely green colour.

Phil Spence crossed *Rhinerrhizopsis moorei* (at the time known as *Sarcochilus moorei*) with *Sarcochilus hartmannii* and registered the grex as *Sarcochilus* Aussie Moore Man. *Rhinerrhizopsis moorei* is a tropical species flowering July to September, with attractive yellow flowers with brown spots, 12–15 mm wide and numerous (10–50). The flowers are short-lived but the species frequently flowers more than once a year and this is one of the species which Walter Upton suggested in his book (Upton 1992) may help extend the *Sarcochilus* hybrid flowering season. There is a photo of a flower of *Sarco.* Aussie Moore Man in *Sarcochilus Orchids of Australia* (Upton 1992).

Prospects of breeding with other Australian *Aeridinae* species

Australia has a number of other *Aeridinae* genera but many species do not have any obvious appeal for hybridising. Some are leafless with small, insignificant sequentially-opening flowers. Others are sporadic-blooming with only one or two nondescript flowers out at once. Others have flowers that are so small it would be difficult to retrieve their pollen. However, there are several species which not only have desirable floral qualities but could possibly also help extend the flowering season or add warmth tolerance, which would benefit growers in the subtropics:

- *Luisia tristis* (syn. *atacta*) – November to April, tropical, flowers 9–11 mm wide, green, only 1–3 of them at sporadic intervals but they have a prominent dark red labellum;
- *Mobilabium hamatum* – July to August, tropical, easy grower, 5–15 open flowers

Table 4 ANOS & AOC & OSCOV Awards for *Aeridinae* Intergeneric Hybrids

Year	Plant and Award	Owner
1998	*Plchs.* Longwarry 'Shane' HCC/OSCOV	G. Young
1998	*Plchs.* Longwarry 'Tan Gem' HCC/OSCOV	G. Young
1998	*Plchs.* Longwarry 'Ian' HCC-AD/OSCOV	G. & B. Khann
1999	*Prschs.* Olive Grace 'Daisy' HCC/AOC (Qld)	A. & A. Gibbard
1999	*Plchs.* Harlequin 'Court Jester' AD/AOC (NSW)	D. Butler
2000	*Prschs.* Olive Grace 'Lavender Mist' HCC/AOC (Tas.)	J. & R. Cannon
2001	*Prschs.* Olive Grace 'Goodwood' HCC/OSCOV	T. & M. Elgood
2002	*Prschs.* Olive Grace 'Lavender Cottage' HCC/AOC (Tas.)	P. & H. Jackson
2002	*Prschs.* Olive Grace 'Margaret' HCC-CC/OSCOV	T. & M. Elgood
2007	*Plchs.* Nellie's Baby 'Jo' AD/OSCOV	B. & B. Khann
2010	*Plchs.* Richard Jost 'The Star' HCC-AD/AOC (NSW)	N. Roper
2013	*Plchs.* Harlequin 'Moonlight' HCC/ANOS (NSW)	D. Butler
2013	*Plchs.* Kilgra 'Killa' HCC/AOC (NSW)	N. Roper
2014	*Plchs.* Richard Jost 'Altay' HCC/AOC (NSW)	N. Roper
2016	*Plchs.* Jester 'Elisa' HCC-AD/AOC (Vic.)	J. Haniver
2107	*Plchs.* Jester 'Sunset' AD/ANOS (NSW)	D. Butler
2018	*Prschs.* Olive Grace 'Imp' HCC/AOC (SA)	K. Western
2018	*Prschs.* Olive Grace 'Vincent Vista' AM/AOC (SA)	M. Willoughby & O. Ju
2018	*Prschs.* Mem. Iris Pendle 'Roslyn Joyce' AM-ACM/AOC (NSW)	D. Knight

Peristerchilus Mem. Iris Pendle 'Roslyn Joyce' Photo Phil Radford

Peristerchilus Olive Grace

6–7 mm wide in pale green or brownish yellow with an interesting deep brown/ purple labellum;

- *Pomatocalpa marsupiale* – November to May, tropical, chunky creamy yellow flowers with a distinctive pouch-like labellum, 12–15 mm wide on panicles having 15–20 flowers per branch, the flowers crowded in a dense head;
- *Robiquetia gracilistipes* – March to May, tropical, 10–40 spotted yellow-brownish flowers 6–7 mm wide;
- *Robiquetia wassellii* – June to August, tropical, 12–14 striking dark green flowers with some pink/red in central area and a white labellum, flowers 6–7mm wide;
- *Saccolabiopis armitii* – September to December, tropical, 20–50 tiny yellowish-green flowers only 3–4 mm wide;
- *Trachoma speciosum* – December to May, tropical, up to 15 short-lived flowers at once, 8–10 mm wide, cream with an orange & white labellum. There are also two other attractive Australian *Trachoma* species.
- *Trichoglottis australiensis* – November to May, tropical, 2–6 creamy-yellow flowers with red-brown blotches, 10–12 mm wide;
- *Vanda hindsii* – November to March, tropical, 3–7 flowers, 30–35 mm wide, shiny brown.

Awards

Several intergeneric hybrids have received quality awards or Awards of Distinction (presumably for colour) from the Australian Orchid Council, ANOS, and OSCOV (Table 4). At this stage only *Peristerchilus* and *Plectochilus* have received awards. As well as the two plants of *Plchs*. Longwarry (*Plrhz. tridentata* x *Sarco*. Heidi) grown by G. Young to which OSCOV granted Highly Commended Certificates on 1 October 1998, the owner also received an Award of Quality for those plants and their siblings. That award may be granted by OSCOV when a group of at least five superior siblings of one grex raised from a single seed capsule by the same grower is shown together. At least one needs to be worthy of a quality award.

Photographs of all plants awarded by ANOS and the Australian Orchid Council can be found by clicking on the Judging tabs on their respective websites: anos.org.au and orchidsaustralia.com.au.

Conclusion and Future

There is a bright future for Australian *Aeridinae* hybrids. Though some of our most prominent *Aeridinae* hybridisers have put away their toothpicks, others have taken up the challenge and we are seeing interesting new intergeneric crosses as well as *Sarcochilus* hybrids. *Sarcochilus hirticalcar* has proved to be the key to having *Sarcochilus* hybrids flowering all year round, and use of the other *Aeridinae* species is increasing the range of hybrids which flower outside the main *Sarcochilus* season. More extensive use can be made of species such as *Rhinerrhizopsis moorei* and *Peristeranthus hillii,* and hybrids previously made can be repeated. Experimental hybrids should be made with the various untried epiphytic *Aeridinae* species, and those species and the existing hybrids should be combined with *Sarcochilus hartmannii* in order to produce progeny which will grow readily in pots. I look forward to seeing the results.

Acknowledgements

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Roslyn Capell is an ANOS and Australian Orchid Council judge.

Dendrobium section *Rhizobium*: An Update on Breeding, ANOS Award Standards and Culture

Text and photos Callyn Farrell
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Summary

Dendrobium section *Rhizobium* continues to increase in popularity in Australia and abroad. The influence of key species in breeding hybrids is reported for the *D. teretifolium* complex, *D. striolatum*, *D. fuliginosum* and *D. bowmanii*. Some outstanding hybrids are *D.* Tweetas, *D.* Australian Ginger, *D.* Nutmeg, and *D.* Lauren and these have been used in next generation breeding with promising results. Cultural advice is presented and 17 ANOS awarded hybrids overall in the section are listed.

Introduction

Section *Rhizobium* Lindl. was established by John Lindley in 1851 based on *D. linguiforme*. This classification was used by Schlechter in his major revision of *Dendrobium* in 1911–14. Brieger proposed in 1981 that this group be separated as a new genus *Dockrillia*, but this is not accepted internationally. *Dendrobium* sect. *Rhizobium* includes around 30 species, which are mainly centred in Australia (17–18 species) and Papua New Guinea (10 species described so far), with others in New Caledonia, Fiji, Tahiti, Samoa, Aru Islands and Vanuatu. Name changes have been common over the years e.g. *D. striolatum* Rchb.f. was previously described as *D. teretifolium* (1839), *D. milliganii* (1859) and *Callista striolata* (1891) (Clements 1989).

The species are very variable in leaf form and the flowers are commonly non-resupinate, appearing upside down. Each growth typically carries only a single leaf, which in the majority of species is long, pendulous, and terete. Some species, such as *D. linguiforme*, deviate by having broad, laterally flattened leaves, which are very fleshy and leathery. This feature can also be seen in *Dendrobium* section *Lichenastrum* and some other species. Plants are usually found at low to moderate altitudes, growing as epiphytes or lithophytes in rainforests and open forests, often in bright light. The brighter the light the redder the growths become, due to the presence of anthocyanins.

Culture

Down Under Native Orchid Nursery (DUNO) is in Newcastle, New South Wales, in a suburban area that is quite shaded and has a wide range of temperatures through the year. Temperature typically varies from 7–30° *C* and is rarely below 4.5° C or above 33° C. We prefer to use various sizes of squat pots manufactured by *The Orchid Pot Co*. These quality pots come in an extensive range of sizes and are made of durable plastic. The free draining design is the reason these pots have been so successful.

Avoid high nitrogen fertiliser as it leads to soft, fungal-prone growth and few flowers. We use a high potassium fertiliser with a N:P:K of 8:5:25, at a rate of one gram/litre of water fortnightly, all year round. We compliment this by using *Amino Grow* as a drench or foliar feed. This helps the uptake of potassium (K) whilst also maintaining a high level of sugars. To maintain optimum results, we use micro-fine lime at the rate of one gram/litre in early autumn and again at the beginning of spring.

Our main tunnel house is covered in 30% black shade cloth. This allows maximum light, which most species and hybrids of this section require to produce masses of flowers. However, some species such as *D. pugioniforme* may prefer less light. Species such as *D. chordiforme* and *D. erythraeum* may grow better with a covered roof over the winter months. In our conditions these plants prefer to remain consistently moist all year around. No dry spell is required for most species and hybrids, apart from *D. teretifolium* var. *fasciculatum,* which will benefit from reduced watering in the winter. Constant and consistent air movement is crucial to growing this section. Hanging the plants helps in achieving optimal air movement. I believe it is best to keep the plants consistently moist throughout the warmer months.

Propagation and Pruning

Plants can be propagated quite easily. It is best to take a cutting when a new aerial root forms outside the pot. Cut above the new root when

Dendrobium Amphion Callisto 'Genesis'

Dendrobium Harmon 'Mark'

Dendrobium Hunter Doll 'Blue Wave'

Dendrobium Hunter Hope 'Genesis'

Dendrobium Hunter Horizon 'Spots'

Dendrobium Hunter Horizon 'Yellow'

it is 5 cm long and pot into a 50 mm tube. If a cutting has no roots a rooting hormone may be useful. The pruning method is used to initiate new growths at the base of the plant. Older plants, especially those of the *D. teretifolium* complex, and *D. schoeninum* especially, may need pruning. These plants sometimes become full of 'dead wood' when growths are lengthy and don't flower. We suggest pruning after flowering and before new growth is initiated. Be careful not to prune too hard. We usually take 2–5 growths from a mature plant.

Current Growing Medium

A medium starting with a quality treated pine bark. We use *Kiwi Orchid Bark*, and Size 2 is recommended for 50–80 mm pots and Size 3 for larger pots. Pine bark makes up around 70% of the medium, the remaining 30% is 10 mm scoria rock. A mixture of chopped *Sphagnum* moss and perlite may also be useful in growing cuttings with minimal or no root growth.

We are not strong advocates of mount culture, and most of our collection of around 1000 mature plants has been growing in pots for some years, however some species require mounts to flourish. These are the *D. teretifolium* complex, *D. cucumerinum*, *D. linguiforme*, *D. pugioniforme*, *D. racemosum* and *D. rigidum*, which have all grown well on cork mounts or aged hardwood. Some growers use 'gutter guard' mounts but we have found plants dry out too quickly.

It is crucial to explore what media we have previously used and explain why they were not successful. Composted pine barks were the first used. These barks started out as high quality, affordable and long-lasting products. However, over time they became expensive, far too composted and contaminated with slugs and wood. This is the reason we started using coconut fibre, and this product was used in equal parts with pine bark to reduce the cost of the medium. However, this product quickly deteriorated to almost mud in our conditions and held salts easily, leading to loss of roots. Major inconsistencies in product quality and pH ultimately led to it phasing out. Next came perlite, because it reduced cost and aided in moisture retention, while also aerating the medium. Perlite is also capable of retaining possibly harmful salts and it seems to heat up in warmer weather and therefore can burn the root system.

Selected Species

Dendrobium striolatum

The striated markings on the segments and widely opening flowers have made it attractive to breeders. *Dendrobium striolatum* generally produces singular flowers; sometimes two are produced, but in my experience this occurs inconsistently. Forms with large shapely flowers have mainly been used in breeding and four generations of line breeding were completed by Brian Gerhard and Neil Finch. Our collection of more than 50 forms flower in October or November depending on the climatic conditions of that year, and flowers typically last around 12 days. Plants achieve specimen size very quickly and I have found pot culture to be best as this does not allow the plants to dry out. Due to the lithophytic nature of this species we add extra scoria rock to the potting medium. While line breeding had ceased, in 2018 we began line breeding again. *Dendrobium striolatum* has proved successful in breeding - it reduces flower count but produces superior shape, ease of growth and general floriferousness. It tends to dominate colour saturation when it is present in the current generation, however has less of an effect than the *D. teretifolium* complex.

Dendrobium teretifolium complex

The complex is probably the most popular group of the section in cultivation and has also been extensively used in hybridisation. The *D. teretifolium* complex was most likely attractive to pioneer hybridisers because of flower size, floriferousness and clear colours. Usually 6–15 flowers per inflorescence are produced and plants flower very freely. Some minor variations in the shade of colour and flower size are reported. Some may regard varieties of the complex as separate species, however variation in size, shape and colour are small to moderate and most likely reflect typical genetic changes seen with geographical distribution. *Dendrobium teretifolium* seems to do best on hardwood mounts; however some varieties within the complex have performed well in pots. The *D. teretifolium* complex may continue to be

used in hybridisation but perhaps should be used minimally, due to the tendency to reduce colour saturation and create large growing plants with relatively low floriferousness.

Dendrobium fuliginosum

This species typically produces 3–7 flowers which do not open widely and it can flower sporadically, but the major flowering occurs in late spring. Flower size and shape has been quite variable for us - this could be because most plants are selfings. The flowers are very dark and colour does not vary dramatically. We have found these plants like medium to high levels of light and grow best in pots or tree fern pots, as they keep the roots moist and cool. Phil Spence completed very successful cornerstone breeding with *D. fuliginosum* that has led to some of the best hybrids within the section to date eg *D.* Australian Ginger and *D.* Tweetie. *Dendrobium fuliginosum* provides in hybridisation the desired 'spray can effect', sometimes repeat flowing and diverse colours. When crossed with *D. striolatum* based hybrids, *D. fuliginosum* generally has little influence on shape.

Dendrobium bowmanii

This species generally produces 1–2 flowers, but occasionally has 3–4 flowers (Upton 1989). Flowers are green to yellowish-green, with purple-brown striate markings on the rear of the segments. High light has proved best, along with frequent watering in warmer months, slightly reduced in winter. *Dendrobium bowmanii* may benefit from protection in southern states. Mount culture is suitable but we have had good results with pot culture. No extensive line breeding has been completed to my knowledge, but *D. bowmanii* has been used recently in experimental breeding especially by George Byrne-Dimos in Victoria, with mixed results, usually intermediate between the two species involved. The green colours of *D. bowmanii* could prove interesting in future breeding. Germination has proved difficult to achieve in my experience. It may be more beneficial than *D. mortii* as is easier to grow and flower.

Standout Hybrids

Dendrobium Tweetas (registered DUNO 2005) is *D.* Tweetie x *striolatum*. Several different *D.* Tweetas were sown by DUNO. The most outstanding results were from cross 1877 using *D. striolatum* 'Tasmanian Gold'. These hybrids had intense colour. However, as is usually the case when *D. striolatum* is present in the immediate gene pool, the flower count was reduced, and this is something to be considered in future breeding.

Dendrobium Australian Ginger (registered Australian Orchid Nursery 2003) was the hybrid that demonstrated what is achievable by knowledgeable individuals. DUNO has sown around 15 variations of *D.* Australian Ginger using different forms of *D. striolatum*. For a primary hybrid between *D. fuliginosum* and *D. striolatum* the shape of the flowers and the colouration can be very attractive. Even when *D. striolatum* was used as the pollen parent it was evident that substantial amounts of colour were transmitted to the progeny. *Dendrobium striolatum* 'Ruffles' FCC/AOC-OSNSW, AM/ANOS provided its progeny with broad labellums and large frills, while still maintaining rounded segments and good colour saturation, mainly of the petals. *Dendrobium striolatum* 'Tasmanian Gold' created an intensity of gold with a burgundy 'spray can' affect, the most pleasing colours by far.

We purchased a flask of *D.* Nutmeg from Phil Spence (registered 2009) in the early 2000s and grew about 50 plants on to flowering. This year several plants have been identified to be used in further breeding with potential for high flower counts, vast range of colour variations and great shape. We had quite a number of successful crosses in 2015, for example using *D.* Grumpy, *D.* Australian Freckles and *D.* Weatherly.

Dendrobium Lauren 'Holly Chief', registered in 2009, was awarded HCC/AOC and HCC/ANOS at the 2015 Kempsey Speciosum Spectacular. Brian saw the capabilities of this plant and since then we have flowered *D.* Lauren x *D.* Australian Ginger. The results have been exciting. The shape, flower count and ease of growth have all carried through to the progeny. We used it in 2015 for several hybrids, and feel the wide labellum and the expansive size of the flowers will produce worthwhile results.

Dendrobium Rigidigge

Dendrobium Tweetas 'Curly Gold' AM/AOC 2018

Dendrobium Tweetas 'Neville' AM/AOC 2018

Dendrobium Tweetas 'Old Gold'

Dendrobium Wickersham 'Dusty'

Dendrobium Wickersham 'Genesis'

ANOS Judging Standards

Shape
Optimum shape for the style of hybrid being judged, in relation to its parentage. Flowers should be balanced and segments should be well proportioned.

Colour and Attractiveness
Shall include white or any other colour or combination of colours. It should be clear glistening and fresh, and all markings and shadings should be well defined.

Size
Points to be allocated based on the optimum size for the style of hybrid and the exhibit's genetic background. Flowers should be consistent in size along the inflorescence.

Substance and Texture
The flower or flowers should be of good substance and texture, and should be firm, fresh, lustrous and without blemish.

Floriferousness
The exhibit should carry a good floral display in proportion to its size. Credit should be given for clones displaying more flowers than is considered average for the hybrid style being judged.

Habit of Inflorescences
The flowers should be displayed to best advantage and be evenly distributed along the inflorescence. It is also important to consider how you will display plants of this section for judging.

Awards

ANOS have so far awarded 17 hybrids from *Dendrobium* section *Rhizobium*. The following are a sample:

D. Grey Ghost 'Tumbi' AM-AD/ANOS
D. Oliver Jack 'Gerard' HCC/ANOS
D. Lauren 'Holly Chief' HCC/ANOS
D. Australian Freckles 'Best Blue' AM/ANOS
D. Bronze Belle 'Deejee' HCC/AOC
D. Tweetas 'Violet Lip' AM/ANOS
D. Tweetas 'Mustard' AM/ANOS
D. Tweetas 'Albie's gift' HCC/ANOS
D. Australian Ginger 'Wow' HCC/ANOS
D. Australian Ginger 'Golly' FCC/ANOS

As we look through photographs of this selection of awarded hybrids, keeping in mind the ANOS Judging Standards, the following similarities can be observed to form a general judging standard. This standard can be translated into breeding objectives:

Shape: wide, mostly rounded, proportioned and balanced segments. No signs of reflexing or flowers that do not fully open.

Colour: clear, distinctive colours, and markings/colouration are consistent.

Size: size is probably the most variable within this sample, however all flowers are of consistent size on the exhibit. I think because hybrids of this section have quite diverse species composition, size is something judges may need to spend a little more to on refining the way points are allocated.

Floriferousness: Plants are usually medium to large in size. I have observed that plants with a more compact growth habit are favoured in award judging. This may be because the flowers are closer together and therefore form a visual impression that the plant is more floriferous. Individual inflorescence flower count is also quite variable and is dependent on the species composition of the hybrid.

Directions

Registered Hybrids

The following hybrids demonstrate what we have been striving to achieve in the latest generation of breeding.

D. Wickersham (*D.* Lauren x Australian Ginger)
We have recently flowered remakes of this grex using *D.* Australian Ginger 'Wow' HCC/ANOS-AOC. So far examples have displayed large flowers with outstanding shape and colour. The segments of this next generation have been wider, the flowers are open, plants display a high flower count and the growth habit is slightly more compact. The seedlings we have flowered have been winning against mature awarded plants and I believe they will form part of the future bench mark, especially representing modern *D. teretifolium* style hybrids. We commenced breeding with this grex in 2018 with crosses aiming to once again increase flower count and segment width, while maintaining size and colour.

D. Sharday (*D. chordiforme* x Tweetie)
This is possibly the most experimental we have been thus far, apart from the recent use of *D. wassellii*. The first release of these was made by Brian Gerhard in 2009. We decided to remake this hybrid in 2017, to make them available to a new generation of growers interested in this section. *Dendrobium chordiforme* increases flower count dramatically, while *D.* Tweetie allows these hybrids to repeat flower throughout the year, with two main flowerings in autumn and late spring. Therefore, this hybrid also extends the flowering period from April until late October, with the peak for this section being in mid-August to mid-September. While *D. chordiforme* reduces flower size, *D.* Sharday produced a vast array of colour combinations. I think this grex directly supports the view that species diversification, when used logically, can contribute to achieving much within the breeding of section *Rhizobium*.

D. Hunter Doll (*D.* Rosemary Jupp x *teretifolium* var. *aureum*)
This is most likely one of the last crosses we will register using a variety from the *D. teretifolium* complex. This hybrid was made to obtain more breeding plants with the interesting blue-grey colouration that is produced using *D. teretifolium* var. *aureum* and pinkish hybrids. These cornerstone hybrids will be used with compact growing plants in the next generation of our breeding.

D. Hunter Legend (*D.* Australian Ginger x *teretifolium* var. *aureum*)
As with *D.* Hunter Doll, this hybrid was made to produce plants with increased flower size and relatively high flower counts for future hybridisation. We achieved some of the predictions, with the first flowering seedlings carrying 7–10 flowers per inflorescence. The colours have been mainly yellows and gold, and flower size has been consistently large due to the influence of the pollen parent.

D. Hunter Hope (*D.* Aussie Phil x Australian Ginger), *D.* Hunter Horizon (*D.* Tweetas x Weatherly), and *D.* Hunter Sand Dune (*D.* Tamara x *teretifolium*)
These three registrations are described together as they represent the main aim of our breeding program. They have all achieved improvements in shape, slightly increased flower size, and produced impressive colouration. These hybrids have generated new or built on existing colour combinations. I think they may unlock a very exciting future and I look forward to the progeny. There is still work to be done, especially in regards to improving shape and increasing flower count.

D. Hunter Shadow (*D.* DePablo x Sundance)
This is one of the first crosses to flower that represent the line of *D. schoeninum* and *D. fuliginosum* influenced hybrids. *Dendrobium* Hunter Shadow has produced many different colour variations with many having an intense 'spray can effect' on all segments. This generation displays *D. teretifolium* flower shape, and the next generation will hopefully overcome this limitation, while maintaining attractive colours.

Next Generation

D. Glenn Wall 'Orange' x Tweetas 'Red Lip'
This cross was made due to the potential it holds to add exciting new colours and/or colour combinations. The main aim of this cross is to achieve orange colour, and if not then deep gold flowers. Further, because of the use of *D.* Tweetas 'Red Lip', colourful labellums may result. The first of this cross is expected to flower in 2019.

D. Australian Freckles 'Best Blue' AM/ANOS 2016 x Australian Sunblessed 'Judy'
Dendrobium Australian Freckles 'Best Blue' is the parent of *D.* Oliver Jack and many other quality hybrids. It displays rounded segments and is bursting with colour. The particular *D.* Australian Sunblessed used is the darkest I have seen (our thanks to Ron Young for allowing us to use this plant in our breeding program). The aim of this cross was to produce plants with dark colours, while maintaining a quality shape.

D. wassellii x Hot Coals 'Best'
This is possibly the most experimental cross we have made in almost six years of breeding with section *Rhizobium*. The aim is to produce compact growing plants that have repeat flowering throughout the year and hope that the colour and 'spray can effect' of *D.* Hot Coals will be apparent in this generation. However, no breeding with *D. wassellii* that moves past a primary hybrid level has been carried out so it

is difficult to predict how much colour will be maintained. However, I believe the use of *D. wassellii* will most likely increase flower count. We have also produced *D.* Harmon 'Mark' x *D.* Hot Coals 'Best' to achieve a similar outcome, in case *D. wassellii* reduces colour in its progeny.

D. Australian Ginger 'Wow' HCC/ANOS 2017 x Kalon Byrne-Dimos 'Newbold'
This hybrid uses possibly two of the largest flowers within our collection that have a *D. striolatum* style flower. Large and colourful flowers are expected. Hopefully, the quality shape and flower proportions of the clear yellow *D.* Kalon Byrne-Dimos 'Newbold' will be maintained. This cross should produce plants that can be used in future breeding to achieve a more circular flower shape.

D. Tweetie 'Huge' x Australian Ginger 'Big Guy'
Here we are searching for large and colourful flowers similar to *D.* Tweetas, however, this time with an extra dose of *D. fuliginosum* colour. *Dendrobium* Australian Ginger 'Big Guy' is the largest flower I have seen of this grex. *Dendrobium striolatum* 'Ruffles' FCC/AOC was used to produce it, therefore this hybrid has a large ruffled labellum. While creating hybrids with large, ruffled labellums is not a current priority, it could add to the attractiveness of hybrids in section *Rhizobium*.

D. Lauren 'Holly Chief' HCC/ANOS 2015, AM/AOC 2016 x Martin 'Gold' HCC/AOC 2012
This cross had a very simple objective - to produce large flowers with yellow tones. While maintaining size, we aim to increase segment width. *Dendrobium* Martin 'Gold' also has the attractive feature of being a compact plant with a flower count of four to six flowers per inflorescence.

D. Martin 'Royal' x *D.* Tamara 'JD Spots'
These plants represent the best of our 'spotted' hybrids. Therefore, the cross may result in plants that have a high possibility of being densely spotted, while maintaining flower size and a compact growth habit.

D. Tweetas 'Old Gold' x Grey Ghost 'Tumbi' AM/ANOS 2006, AM/AOC 2018
Using *D.* Grey Ghost 'Tumbi' (*D. striolatum* x *D.* Rosemary Jupp), registered by DUNO 2006) may offer further progress in the breeding program. It has already produced large almost blue-wash hybrids in *D.* James Garner (registered DUNO 2013). Its colouration seems to produce interesting combinations in the progeny, and it could widen the existing range of colours in the section.

D. Nutmeg 'Mars Shadow' x Martin 'Royal'
Dendrobium Nutmeg 'Mars Shadow' has a high flower count, and great shape and colour. Most importantly it has a very compact growth habit. The cross may increase flower count and decrease plant size, while still maintaining the positives of shape, colour and flower size.

D. Rocky Carroll x Australian Freckles 'Best Blue' AM/ANOS 2016
This is the next generation that represents our line of *D. schoeninum* and *D. fuliginosum* influenced hybrids. For many reasons the 'spray can effect' has been a very popular aspect for many breeders. Hybridisation has been limited in the direction of improving flower shape, size and floriferousness. As previous discussed this generation aims to slightly move away from *D. teretifolium* flower shape, along with reducing plant size and increasing floriferousness.

D. Tweetas 'Neville' AM/AOC 2010 x Martin 'Gold' HCC/AOC 2012
Dendrobium Tweetas 'Neville' has excellent shape and colour. We used it with *D.* Martin 'Gold' to increase flower size and floriferousness. Both parents already display quality flower shape and open very well, hence these qualities should be maintained.

Future Breeding

Flower count, shape and size are crucial elements which in the past have been overlooked. Looking to the future, some outstanding colour combinations and more shapely flowers can be expected in further breeding. We are also endeavouring to increase the flower count by the use of *D.* Nutmeg, which have been carrying 10–20 flowers on their second flowerings. The biggest challenge is to create complex growing hybrids without jeopardizing the established positive features of the breeding program.

Individual hybridisers should strive to maintain correct records of parentage. Future updates may require some correction, as we learn more

about past problem areas and errors in labelling, and as scientific reviews of *Dendrobium* sect. *Rhizobium* species become available. This may assist the wider community to better understand the outcomes of the role of species in hybridisation, and in turn assist growers in recording correct parentage. Further, it would be useful to commence line breeding of species within *Dendrobium* section *Rhizobium*, to ensure a sound collection of quality species plants for breeding programs, in case improvement in hybridising stalls.

There is a very exciting future ahead for this section of *Dendrobium*. If careful decisions are made in breeding these pleasant native orchids, they will continue to improve and develop in quality.

Callyn Farrell of Down Under Native Orchids is a hybridist, ANOS Judge and grower of Australasian orchids

9th ANOS Triennial Conference and Show Report

Text and photos Peter Adams, except where specified

The 9th Annual Conference and Show with the theme 'Get Going, Get Growing' was held at the Strathpine Community Centre in Queensland on August 21–25th 2019, in conjunction with the ANOS (Qld) Kabi Group. Members of ANOS Council and Kabi group worked very closely in the planning and operation of the event. The end result was very rewarding to participants and visitors. There was a hall full of exhibits, with plants of *Dendrobium speciosum* predominating, and more than 50 registrants who participated in the conference and extended discussions. The conference occupied one end of the large display hall. It has been a difficult growing year in Queensland, and the display of species and terete orchids in particular was less than is usual at this time of the season.

The major sponsors were the Queensland Community Benefit Fund, Moreton Bay Regional Council, Phil and Irene Ritchie, and the ANOS (Qld) Kabi Group, and the event was a clear financial success. The 50 page Summary of Conference Proceedings was edited and produced by Peter Adams and Sheryl Lawson, covering conference and show information, and topics from all speakers. Presentations ranged from a review of the history of ANOS and its future, warm growing epiphytes, cool growing *Dendrobium*, culture and breeding of Australian *Aeridinae*, conservation and culture of terrestrial orchids, and ANOS judging of the major plant groups.

The session on judging challenges was a significant step forward as it enabled members of judging panels from different states to actively participate, working toward a better consensus of approach across all panels.

Champion Species of the show was awarded to *D. speciosum* var. *curvicaule* 'Daylight Moon', exhibited by Ross and Rhonda Harvey. Champion Hybrid of the Show was *D.* Australian Freckles 'Best Blue', awarded to Down Under Native Orchids. Two plants were awarded, the first *D.* Bellambi 'Genesis' HCC/ANOS 2019 (76 points), a yellow-mauve flowered *Dendrocoryne*-style hybrid, and *D.* Martin 'Gold' HCC-ACC/ANOS (78.6 and 77.2 points respectively), a predominantly deep yellow flowering terete. The photographic competition attracted more than 50 entries and the Best Photograph was awarded to Jon Cara for his portrait of *D. nindii* x *discolor*.

9th ANOS Conference Show Photo Jon Cara

There was also a non-competitive display by Peter Adams of habitat and exhibition photos including Australian orchid field research activities. Full results can be viewed on the website anos.org.au.

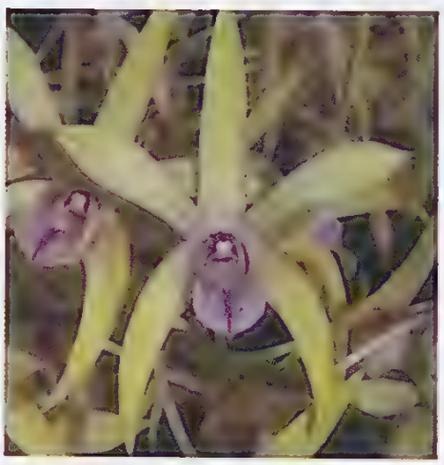
There are strong challenges to the future of stand-alone conferences and shows which include the recruitment of volunteers to organise and run the events, difficulties in falling registrations, and the challenge of obtaining funding to cover increasing costs of venues and other facilities. Thanks again to the Show and Conference committee and those members from Kabi and from Victoria who spent long hours ensuring the event went smoothly.

D. Australian Freckles 'Best Blue'

D. Martin 'Gold' HCC-ACC/ANOS 2019

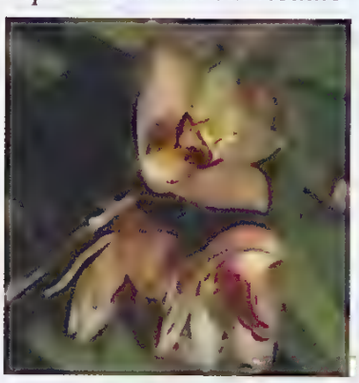
D. speciosum var. *curvicaule* 'Daylight Moon'

D. speciosum var. *curvicaule* 'Daylight Moon'



D. Elegant Heart

D. Samford Snow



D. rigidum

D. Bellambi 'Genesis' HCC/ANOS 2019

D. Tathra x D. speciosum

D. bilobum

Kempsey Speciosum Spectacular

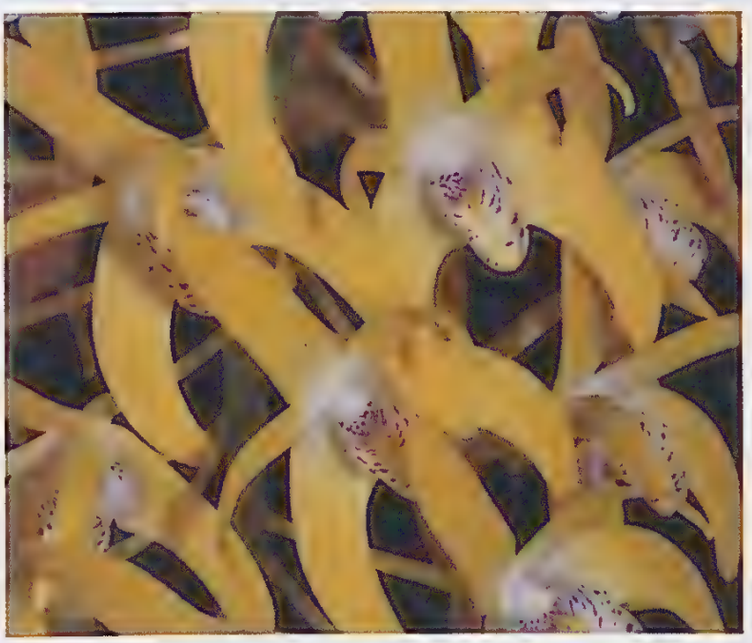
Report, photos Peter Adams

The 2019 Speciosum Spectacular was held from 30th August to 1st September in fine weather. It attracted enthusiasts from far and wide, including attendees of the 9th ANOS Conference and Show held a week previously. There is always plenty of opportunity to see seedlings and well developed mature flowering plants of Australian and Australasian species and hybrids, in particular the diversity of *Dendrobium speciosum*. Meeting other growers and breeders, and socializing into the late evening have become highlights of the ANOS calendar.

The event has developed to its position of prominence due to the hard work and many generous contributions of Ted and Winsome Walmsley and their family, supported by the ANOS Mid North Coast Group, especially John Zietsch, Dennis Sinclair and Richard Murray. It also relies on dedicated growers bringing their plants, many from distant places; and they are highly commended for their ability to present them in prime condition after travel over highways and back roads.

Dendrobium speciosum was again the dominant set of judging classes, with very floriferous plants, perhaps with some not at the highest level of quality due to adverse growing conditions in the months leading up to the event. Champion *Dendrobium speciosum* was Bernie Fletcher's plant of *D. speciosum* 'Maximus', which received HCC/ANOS. Reserve Champion was *D. speciosum* var. *speciosum* 'Kate's Special', exhibited by Ted and Winsome Walmsley. The Col Brandon Trophy is awarded to a hybrid best illustrating the desirable characteristics of *D. speciosum* when used in hybridising. The winner was Henk van den Berg's *D.* Greta Snow 'Patricia', which also won Champion Hybrid and was awarded AM/ANOS. Reserve Champion Hybrid was Wayne Perrin's *D.* Dingadee 'Matt'. There were many hybrids in the *D. speciosum*-style of *D.* Dingadee, showing cream to deep gold flowers of excellent presentation, and more than several exhibited by Wayne. Champion Other Species was *D. tetragonum* var. *tetragonum* 'Bellingen', exhibited by Dennis Sinclair.

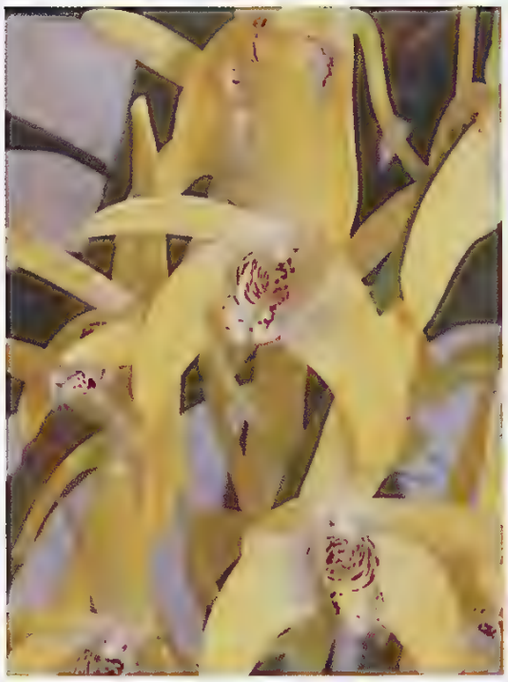
The dinner this year was held in the marquee at the show site, and was very successful with excellent catering, service by volunteers, a plant auction, and opportunities to further interact and socialise with friends and new acquaintances. The Spectacular will be on again next year on the same weekend.



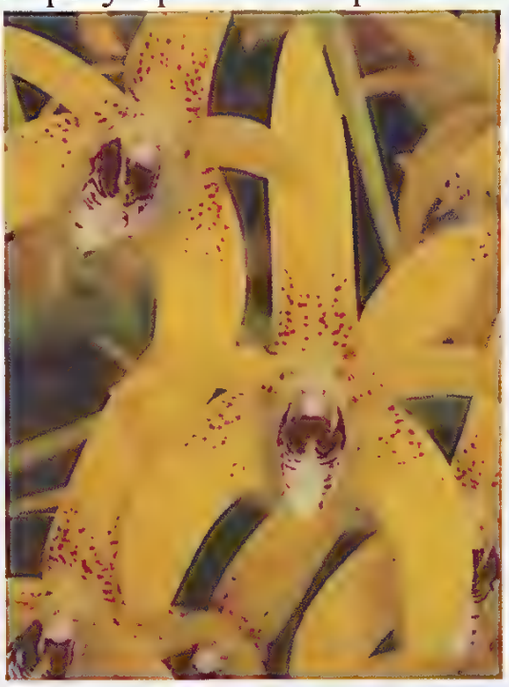
D. speciosum 'Maximus' HCC/ANOS 2019

D. Greta Snow 'Patricia' AM/ANOS 2019

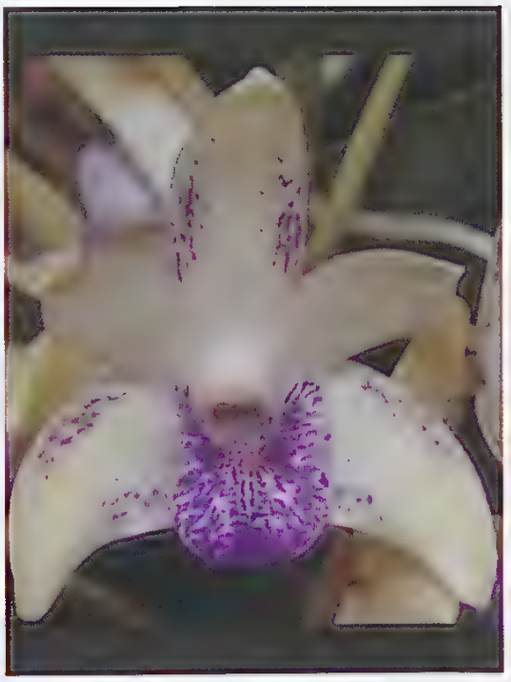
D. Finale 'Sundowner



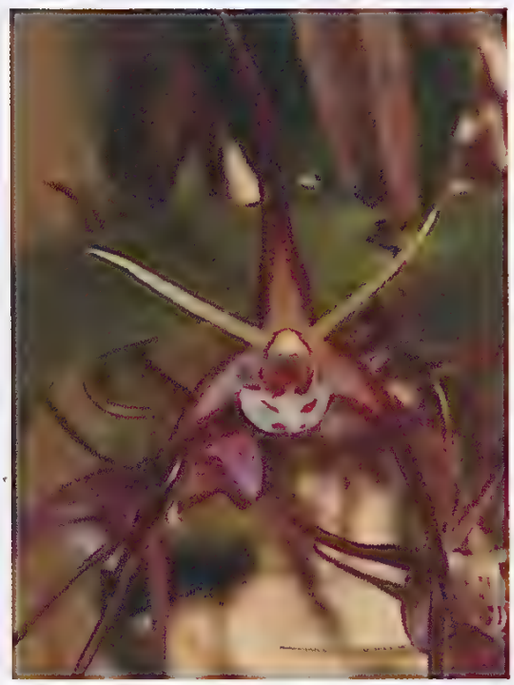
D. Dingadee 'Alex'



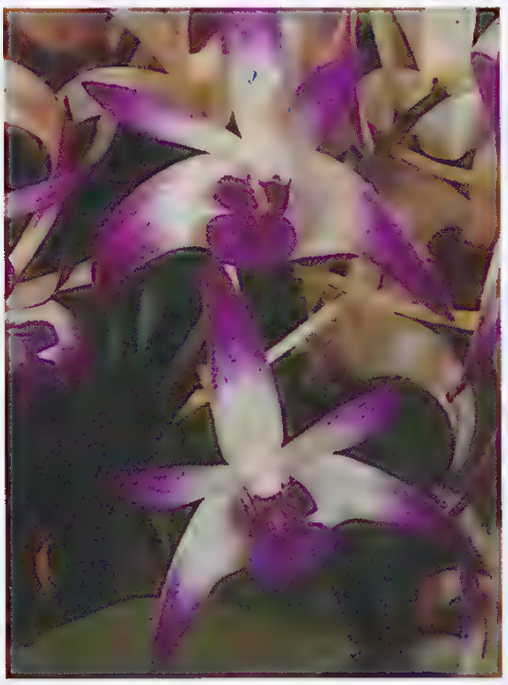
D. Cosmic Gold 'Red Spot'



D. Delicate Bride 'Genesis'

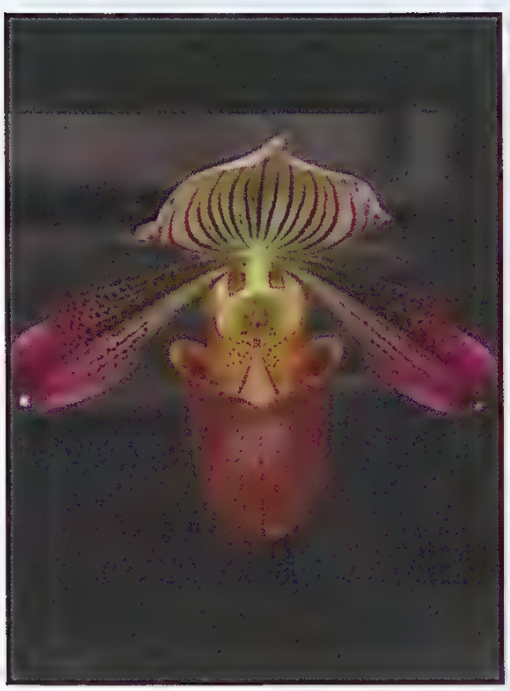


D. tetragonum var. *tetragonum* 'Bellingen'

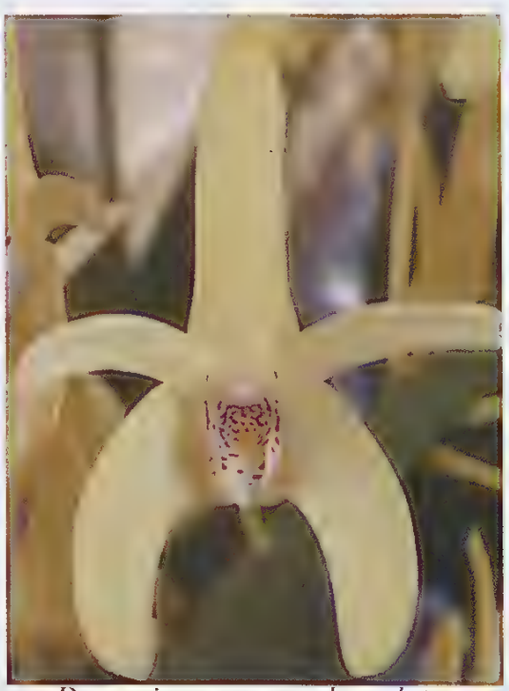


D. Class 'Pauline'

D. Our Native 'Pacific Glory'



Paph. violascens



D. speciosum var. *pedunculatum* 'Wilf x self'

D. speciosum var. *curvicaule* 'Palmerston Mist Debbie Anne'

#344 *Dendrobium* Papuan Delight 'Ginger Falls' ACC/ANOS 2018 (NSW)

Points	77.4
Owner	Trish Peterson
Date & event	20 October 2018 -
Photos by	-
#flowers/inflorescences	330 / 15
Measurements(mm):	
flower	24 across 16 vertical
petal	16L 2W
sepal	15L 2W
dorsal	16L 3W
labellum	6L 3.5W
inflorescence length	102
Detailed avge points:	
shape(25)	
colour(20)	
size(15)	
substance/texture(10)	
floriferousness(15)	
habit/attractive(15)	

#345 *Dendrobium* Gloucester Sands 'Kirra Lea' AM/ANOS 2018 (NSW)

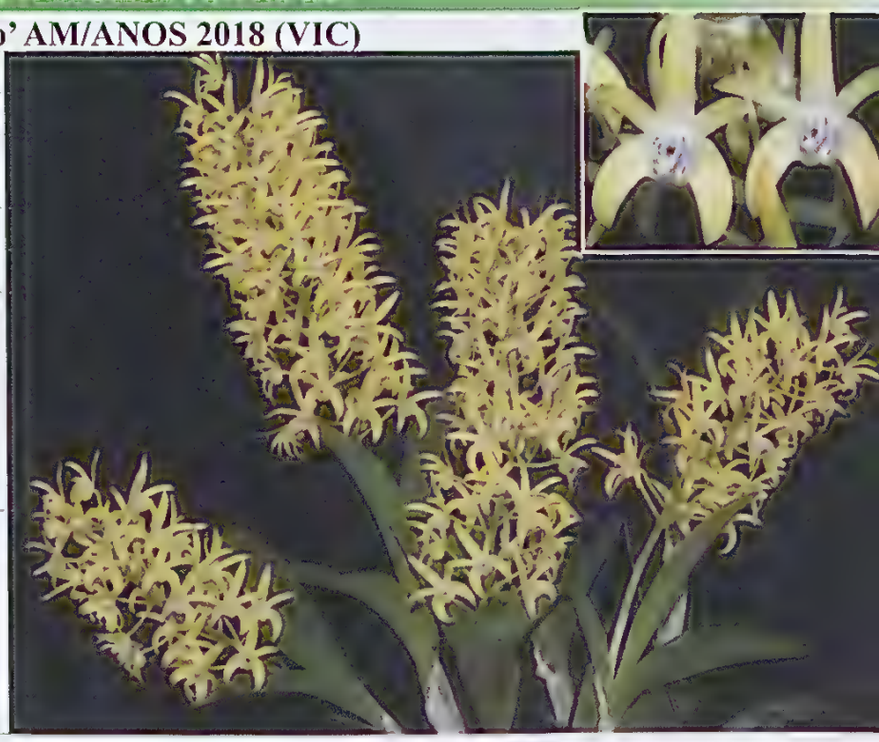
Points	81.2
Owner	George Oehm
Date & event	16 December 2018 -
Photos by	George Oehm
#flowers/inflorescences	102 / 3
Measurements(mm):	
flower	46 across 36 vertical
petal	27L 6W
sepal	19L 6W
dorsal	19L 8W
labellum	17L 6.5W
inflorescence length	550
Detailed avge points:	
shape(25)	20.3
colour(20)	17.2
size(15)	12.0
substance/texture(10)	7.8
floriferousness(15)	11.8
habit/attractive(15)	12.1

#346 *Dendrobium* Nancy Fairfax 'Leeann' AM/ANOS 2019 (NSW)

Points	80.6
Owner	Arnold Lockrey
Date & event	15 January 2019 -
Photos by	Jody Cutajar
#flowers/inflorescences	108 / 19
Measurements(mm):	
flower	101 across 77 vertical
petal	52L 21W
sepal	44.6L 11.5W
dorsal	47L 12.2W
labellum	37.7L 17W
inflorescence length	170
Detailed avge points:	
shape(25)	20.3
colour(20)	16.5
size(15)	12.7
substance/texture(10)	7.4
floriferousness(15)	12.4
habit/attractive(15)	11.3

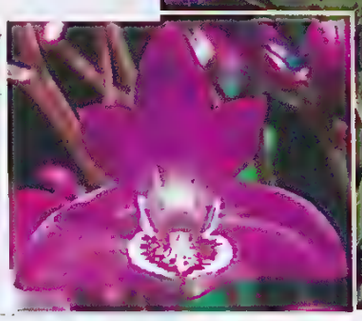
#347 *Dendrobium* Dunokayla 'Tyabb Citrino' AM/ANOS 2018 (VIC)

Points	81.2
Owner	Wayne Turville
Date & event	10 September 2018 Special judging
Photos by	Peter Adams
#flowers/inflorescences	144 & 28 buds / 5
Measurements(mm):	
flower	40 across 63 vertical
petal	33L 7.5W
sepal	32L 18W
dorsal	38L 11W
labellum	22L 7W
inflorescence length	480
Detailed avge points:	
shape(25)	20.1
colour(20)	16.6
size(15)	12.5
substance/texture(10)	7.7
floriferousness(15)	12.2
habit/attractive(15)	12.1



#348 *Dendrobium kingianum* 'Caviar' HCC/ANOS 2018 (NSW)

Points	77.7
Owner	Jody Cutajar
Date & event	13 October 2018 -
Photos by	Jody Cutajar
#flowers/inflorescences	300 & 60 buds / 40
Measurements(mm):	
flower	29.2 across 30 vertical
petal	13.9L 5.7W
sepal	13.8L 10.1W
dorsal	16.9L 9.2W
labellum	11.9L 10.2W
inflorescence length	125.5
Detailed avge points:	
shape(25)	19.3
colour(20)	16.4
size(15)	11.8
substance/texture(10)	7.8
floriferousness(15)	11.8
habit/attractive(15)	11.0

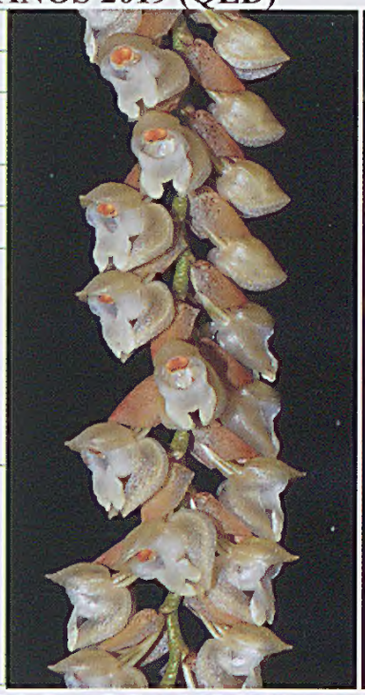


#349 *Sarcochilus* Vista 'Jacksons' AD/ANOS 2018 (NSW)

Points	n/a
Owner	Peter Dowling
Date & event	13 October 2018 -
Photos by	-
#flowers/inflorescences	- / 2
Measurements(mm):	
flower	27.1 across 24.7 vertical
petal	19.3L 4.8W
sepal	16.4L 5.1W
dorsal	18.3L 5.3W
labellum	13L 10.2W
inflorescence length	48
Detailed avge points:	
shape(25)	
colour(20)	AD for colour
size(15)	
substance/texture(10)	
floriferousness(15)	
habit/attractive(15)	

#350/1 *Pholidota imbricata* 'Ann' ACC-ABE/ANOS 2019 (QLD)

Points	ACC 79.0 , ABE 76.6
Owner	Ann & Barry Kable
Date & event	30 March 2019 -
Photos by	Roslyn Capell
#flowers/inflorescences	1728 & 246 buds / 25
Measurements(mm):	
flower	7 across 9 vertical
petal	3L 1W
sepal	6L 2W
dorsal	5L 3W
labellum	6L 4W
inflorescence length	460
Detailed avge points:	
shape(25)	20.3
colour(20)	15.4
size(15)	12.4
substance/texture(10)	7.6
floriferousness(15)	12.1
habit/attractive(15)	12.9



#352/3 *Liparis latifolia* 'Imperial Treasure' HCC-ACC/ANOS 2019 (QLD)

Points	HCC 77.4 , ACC 80.7
Owner	Gary Yong Gee
Date & event	8 September 2018 -
Photos by	Gary Yong Gee
#flowers/inflorescences	438 & 61 buds / 8
Measurements(mm):	
flower	10 across 17 vertical
petal	6L 0.5W
sepal	9L 2.5W
dorsal	8L 2.5W
labellum	15L 10W
inflorescence length	300
Detailed avge points:	
shape(25)	19.9
colour(20)	15.2
size(15)	11.0
substance/texture(10)	7.6
floriferousness(15)	12.1
habit/attractive(15)	11.6

#354/5 *Dendrobium* Martin 'Gold' HCC-ACC/ANOS 2019 (Combined)

Points	HCC 78.6 , ACC 77.2
Owner	DUNO
Date & event	28 August 2019 ANOS Conference
Photos by	Jon Cara
#flowers/inflorescences	393 & 9 buds / 55
Measurements(mm):	
flower	35.7 across 20.1vertical
petal	15.9L 3.4W
sepal	18.1L 4.9W
dorsal	16.8L5W
labellum	16L 6.6W
inflorescence length	60
Detailed avge points:	
shape(25)	19.8
colour(20)	15.9
size(15)	11.7
substance/texture(10)	7.9
floriferousness(15)	11.6
habit/attractive(15)	11.7

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NEW SOUTH WALES

- **ANOS Central Coast**; PO Box 3010, Erina NSW 2250 - Neville Lee (02)4340 5157 2nd Wednesday each month, 8pm. Narara Community Centre, 2 Pandala Rd, Narara 2250
- **ANOS Far North Coast Inc.**: 2 Treelands Cres, Ballina, NSW 2478 - Keith Skaines (02)6686 6303 3rd Saturday of month (except Dec. & Jan.), 2pm various venues, contact the secretary.
- **ANOS Illawarra**: 2 Wilford St, Corrimal NSW 2518 - Bruce Porter (02)4284 8308 2nd Tuesday each month, 7pm. Old Court House, Wollongong.
- **ANOS Macarthur and District**: 7 Pickett Ave, Minto NSW 2566 NSW - Wally Southwell (02) 4681 8589 3rd Tuesday each month, 8pm. Birriwa Community Hall, Fitzpatrick Rd, Mt Annan.
- **ANOS Mid-North Coast**: 69 The Lakes Way, Forster NSW 2428 - John Zietsch (02)6554 9733 3rd Sunday each month, 12 noon, followed by BBQ. Contact for location - Taree or Wauchope
- **ANOS Newcastle Inc.**: PO Box 5079 Raymond Terrace NSW 2324 - Peter Denning (02)4975 3729 4th Thursday of month, 7.30pm. Elermore Vale Community Centre, Croudace St, Elermore Vale.
- **ANOS Sydney Inc.**: 9 Alicia St, Glenwood NSW 2768 - Andrew Locke (02)8824 6338 3rd Friday each month, 8pm. Senior Citizens Hall, B.H. Community Centre, Conie Ave, Baulkham Hills.
- **ANOS Warringah Inc.**: PO Box 421, Forestville NSW 2087 - Bill Dobson (02)9981 2525 3rd Tuesday each month, 8pm. Community Hall, Starkey St, Forestville.

QUEENSLAND

- **ANOS Beenleigh Inc.**: PO Box 1130, Beenleigh QLD 4207 - David Cleal (07)3805 6865 1st Thursday each month, 7.30pm. Showground Hall, James St, Beenleigh
- **ANOS Kabi Inc.**: PO Box 424, Aspley QLD 4034 - David James (07) 3359 5752 2nd Tuesday of month except Jan., 7.30pm. Isabella Griffin Room, Strathpine Community Centre, 199 Gympie Road, Strathpine.
- **ANOS Mackay and District**: 24 Barton St, Mackay, QLD - Arthur Pinkney (07)4952 2186 2nd Thursday each month, Andergrove Community Centre, Celeber Drive, Andergrove.
- **ANOS Townsville Inc.**: 92 Curie St, Wulguru QLD 4811 - John Nuss (07)4778 4311 1st Tuesday monthly (excl. Jan.) 8pm Townsville O.S. Hall, Joe Kirwan Pk, cnr Bamford Lane & Charles St, Townsville
- **Native Orchid Society of Toowoomba Inc**. 106 Umbiram Rd, Wyreema QLD 4352 - Josie Wright (07)4696 2150 1st Friday of month, 7.30pm Lutheran Church Hall, cnr West and Alderley St, Toowoomba

SOUTH AUSTRALIA

- **Native Orchid Society of South Australia Inc.**: PO Box 565 Unley SA 5061 - Les Nesbitt (08) 8261 1550 4th Tuesday each month, 8pm. St Matthew's Hall, 67 Bridge St, Kensington.

VICTORIA

- **ANOS Geelong Inc.**: 609 South Street, Ballarat VIC 3350 - Anita Hinton (03) 9743 6040 2nd Wednesday each month, 7.30pm. Uniting Church Hall, Yarra St, Geelong.
- **ANOS Melbourne Suburbs Inc.**: PO Box 169, Bayswater VIC 3153 - Richard Johnson 04 7808 7752 4th Wednesday of month (excl. December), 7.30pm. Montrose Primary School, Leith Rd, Montrose 3765
- **ANOS Victoria Inc.**: PO Box 308, Boronia VIC 3155 - (03)9387 2771 1st Friday each month, 8pm. Toorak Uniting Church Hall, , 603 Toorak Rd, Toorak.

WESTERN AUSTRALIA

- **ANOS Western Australia Inc.**: Mrs Lyn Morgan, 99 Bywater Way, Wilson WA 6107 - (08)9451 2164 2nd Monday each month, 8pm. Wilson Community Hall, Braibrise Rd, Wilson.

NEW ZEALAND

- **ANOS New Zealand Native Orchid Group** 42 Titiro Moanna Rd, Korokoro, Lower Hutt 5012

Dendrobium Bellambi 'Genesis'
HCC/ANOS 2019 Photo Peter Adams